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HANDBOOK

FOR THE

64-PR. RIFLED M.L. CONVERTED
GUNS OF 58 AND 71 CWT., L.S.

1887.



LONDON:
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
BY HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HER MAJESTY.

And to be purchased, either directly or through any Bookseller, from
EYRE & SPOTTISWOODE, EAST HARDING STREET, FLEET STREET, E.C.; or
ADAM AND CHARLES BLACK, NORTH BRIDGE, EDINBURGH; or
HODGES, FIGGIS & Co., 104, GRAFTON STREET, DUBLIN.

1887.

Price One Shilling.

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Correct to 1.6.87.

64-pr. Rifled Muzzle-loading converted Guns of 71 cwt. and 58 cwt.

THE GUNS.

(List of Changes, §§ 2066, 3092.)

(Plate I.)

				71 cwt. gun.	58 cwt. gun.
Material	Exterior	....	....	cast iron	cast iron.
	tube	....	....	wrought iron	wrought iron
Length, total	....	....	....	122.72 inches	127.45 inches.
Weight, total	....	....	....	71 cwt.	58 cwt.
Preponderance	....	....	....	6.375 cwt.	6 cwt.
Bore	calibre	....	....	6.3	6.3.
	length	....	....	103.27 inches	108.45 inches.
	capacity	....	....	3196 cub. ins.	3358 cub. ins.
	system	....	....	plain groove	plain groove.
Rifling	twist in calibres	....	....	1 in 40. U.	1 in 40. U.
	length	....	....	96.27 inches	101.45 inches.
	grooves	number	....	3	3.
		depth	....	.115 inch	.115 inch.
Vent	material	....	....	copper	copper.
		....	....	radial	radial
	description	....	....	radial	radial
	distance from end of bore	....	....	1.8 inches	1.8 inches.

There are two patterns of this gun, converted on the Palliser principle, in the land service, mounted on garrison standing carriages or on sliding carriages and traversing platforms, viz. :—

64-pr. of 71 cwt., converted from 8-inch S.B. of 65 cwt.

64-pr. of 58 cwt. „ 32-pr. S.B. of 58 cwt.

The system of conversion is the Palliser, and consists in boring out the cast iron gun to form a casing, and inserting therein a coiled wrought iron barrel, kept in position by an iron collar, and a screw plug under the trunnions.

The gas escape channel is to be found at the right top of the cascable.

These guns are examined after every 100 rounds.

In the 71-cwt. gun the old vent patch is removed, and the old vent closed with a wrought-iron screw plug, a new vent being drilled a little from the breech end; it is bushed with a “through” vent. The 58-cwt. gun is vented in the original position.

Sights.*

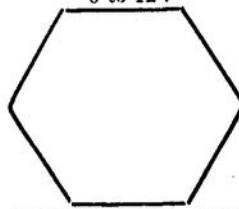
(Plates II. and III.)

The 58-cwt. gun is provided with centre sights only, viz. : a *centre hind*, a *centre fore*, and a *muzzle sight*.

The *centre hind sight* is hexagonal, and of gun-metal, and is graduated up to 12 degrees. It is provided with a cross head, and sliding leaf for deflection, and is marked as follows :—

* The 8-lb. R.L.G.³ charge is now superseded by 8½-lb. R.L.G.⁴, and the sights as graduated for the former are suitable for use with the latter. Pending the issue of R.L.G.⁴ powder 6-lb. R.L.G.³ will be the only charge for service.

Mark VI. Sight.
0 to 12°.



Full 8 lbs.; Fuze 31.

Full 8 lbs. Yds. 4000.

The *centre fore sight* is of the usual form of drop sight, and fits into a gun-metal bracket, screwed on to the gun.

The *muzzle sight* is a small screw hog-backed sight, screwed into a recess in the muzzle patch.

Previous to 1877 these guns were provided with two sights only, a short centre hind graduated only to 5 degrees, and having a plain head, and a centre fore as already described.

The 71-cwt. gun is provided with side sights only, viz. :—

2 *tangent scales* (one on each side) graduated up to 15°, and marked as follows :—



SHELL, FULL
8 lb. FUZE.

Mark IV. (or Marks II. and III. altered to Mark IV.) tangent sights, with deepened notch, can be issued with this gun.

2 *trunnion sights* (one on each side), of the drop pattern, fit into gun-metal brackets attached to the gun, over the trunnions, by two screws.

When mounted on Moncrieff principle, in addition to the ordinary sights, the guns are fitted with the Moncrieff reflecting sight, see Plate II., which consists of two mirrors. One of these mirrors is secured to the end of the right trunnion of the gun by a circular bracket, and the other is fixed in a sliding bracket or frame which can be moved along a gun-metal bar screwed upon the lower part of the elevator, and which is graduated in degrees.

To lay the gun by these sights, it is necessary that the object aimed at, and the intersection of the cross lines upon the upper mirror should correspond with the intersection of the lines upon the lower mirror, the latter being clamped on the bar at the proper angle of elevation.

The reflecting sights are graduated for quadrant elevation, and will not agree with the tangent scale unless the gun be laid on an object on the level of the horizon.

CARRIAGES AND PLATFORMS.

The following garrison mountings can be used with the 71-cwt. and 58-cwt. guns respectively.

R.M.L. 64-pr. 71-cwt.

Carriage, common, wood.
 Carriage, common, iron, No. 1.
 Carriage, sliding, medium No. 10, and platform medium No. 11 (13 feet 2 inches long, 4 feet 3 inches parapet).
 Carriage, sliding, medium No. 10, and platform medium No. 12 (13 feet 2 inches long, 3 feet 6 inches parapet).
 Carriage, sliding, medium No. 11, and platform medium No. 13 (11 feet long, 3 feet 6 inches parapet).
 Carriage, sliding, medium No. 12, and platform medium No. 19 (13 feet 2 inches long, 2 feet 7 inches parapet).
 Carriage, sliding, medium No. 23, and platform medium No. 16 (16 feet long, dwarf).
 Carriage, sliding, medium No. 23, and platform medium No. 17 (16 feet long, dwarf, A and B only).
 Carriage, sliding, medium, No. 23, and platform medium No. 18 (16 feet long, 6 feet parapet).

R.M.L. 64-pr., 58-cwt.

Carriage, common, wood.
 Carriage, common, wood, depression.
 Carriage, common, iron, No. 2.
 Carriage, sliding, medium, No. 13, and platform medium No. 11 (13 feet 2 inches long, 4 feet 3 inches parapet).
 Carriage, sliding, medium No. 13, and platform medium No. 12 (13 feet 2 inches long, 3 feet 6 inches parapet).
 Carriage, sliding, medium No. 24, and platform medium No. 16 (16 feet long, dwarf).
 Carriage, sliding, medium No. 24, and platform medium No. 17 (16 feet long, dwarf, A and B only).
 Carriage, sliding, medium No. 24, and platform medium No. 18 (16 feet long, 6 feet parapet).
 Carriage, sliding, medium No. 25, and platform medium No. 14 (16 feet long, casemate).
 Carriage and platform, Moncrieff, Mark II.

Carriage, Garrison, Common Wood, R.M.L., 64-pr.,
 71-cwt.

*(List of Changes, § 3092.)**(Plate IV.)*

This carriage is converted from the 8-inch 65-cwt. naval carriage. It consists of two brackets and a transom of elm, two axletrees of oak with arms $6\frac{1}{2}$ inches diameter, and four trucks of elm or of cast iron. The diameters of the front and rear elm trucks are 18 inches and 16 inches respectively; of the cast iron 19 inches and 16 inches. Blocks are secured under the rear axletree upon which the carriage can stand in the event of damage to the trucks.

The stool bed of elm is hollowed out on the underside for the elevating screw, and is fitted with a hinged clasp, by which it is secured to a transverse stay between the brackets. The elevating screw is of the "ratchet head and lever pattern"; the coils are elm, African oak, or sabicu.

The carriage is fitted with an eye bolt on each side, a metal nut for the elevating screw, and a leather loop for the priming irons.

The wood garrison standing carriage for the S.B. 8-inch 65 cwt., fitted with Allen's brake, can also be used for the R.M.L. 64-pr. 71-cwt.

It is similar to the carriage of the R.M.L. 64-pr. 58-cwt., except in width between the brackets.

Carriage, Garrison, Common Wood, R.M.L., 64-pr. 58-cwt.

*(List of Changes, §§ 2114, 2631.)**(Plate V.)*

This carriage differs principally from that already described in being fitted with a wrought iron stool bed, and cast iron trucks, the front being 19 inches in diameter, $6\frac{1}{2}$ inches wide; the rear 16 inches in diameter, 5 inches wide.

The axletrees are of oak, with arms $7\frac{1}{4}$ inches in diameter. It has also Allen's brake. This brake consists of a wooden wedge, shod with iron, attached to each bracket in rear of the front trucks by jointed iron bars, one of which passes through the axletree and forms a linch pin. The wedge follows the truck as the carriage runs up, but on recoil it is overtaken by the truck, which rides on it, and is thus skidded. The wedge is secured out of action by means of a lanyard, with which it is fastened to a cleat on the side of the carriage.

Carriage, Garrison, Common Wood, R.M.L., 64-pr.
58-cwt., Depression.

(*List of Changes*, § 2706.)

This carriage differs from the preceding one in being adapted to allow 30° depression. For this purpose the carriage is fitted with capsquares, the hollow of the transom is increased, the stool bed is bent to a suitable form, and the stool bed bolt fixed much higher and nearer the rear. The rear steps of the brackets are blocked up to the level of the second, so as to carry a wooden moveable block, to which is fitted the elevating screw.

Carriage, Garrison, Common, Iron, No. 2, with Trunnion
Plates. R.M.L. 64-pr. 58-cwt.

(*Also*, S.B. 32-pr. 58-cwt., and with collars S.B. 32-pr. 56-cwt.)

(*List of Changes*, § 1474.)

(*Plate VI.*)

The body of this carriage consists of two skeleton iron brackets, connected by a fore and hind axletree, and by two transom bolts. Steps are riveted to each bracket for the application of handspikes when elevating.

The hind axletree has two blocks of sabicu bolted to its underside, so that the carriage can be converted to a "rear chock;" the axletree is also fitted with a handspike iron for the roller handspike when required.

The trucks are of elm, shod with a ring tire, and metal bushed. Cast iron trucks are issued for use with the carriage when not in "action," so that the wooden trucks can be placed in store to preserve them from the effects of the weather.

The gun is elevated by means of a wrought iron stool bed (pivoted to the second transom bolt), a coin and hand coin of sabicu, and an elevating screw of the "ratchet head and lever" pattern. The screw works through a fixed nut in the rear axletree.

This carriage can also be used for the R.B.L. 40-pr. gun, by the addition of special trunnion plates.

Carriage, Garrison, Common, Iron, No. 1, with Trunnion
Plates. R.M.L. 64-pr. 71-cwt.

(*Also*, S.B. 8-inch, 65 or 54 cwt.)

(*List of Changes*, § 1474.)

This carriage differs only from No. 2 in the width between the brackets, and the fitments of the trunnion holes.

Carriage, Garrison, Sliding, Medium, No. 10.

(Iron, R.M.L. 64-pr. 71 cwt., 4 feet 3 inch or 3 feet 6 inch parapet for platforms Nos. 11 and 12.)

Carriage, Garrison, Sliding, Medium, No. 13.

(Iron, R.M.L. 64-pr. 58 cwt., 4 feet 3 inch or 3 feet 6 inch parapet, for platforms Nos. 11 and 12.)

Platform, Traversing, Medium, No. 11.

(Wood, B.L. 7-inch 82-cwt., R.M.L. 64-pr. 71-cwt. and 58-cwt., 4 feet 3 inch parapet for iron carriages, Nos. 2, 10, and 13, 13 feet 2 inches long.)

Platform, Traversing, Medium, No. 12.

(Wood, B.L. 7-inch 82-cwt., R.M.L. 64-pr. 71-cwt. and 58-cwt., 3 feet 6 inch parapet for iron carriages, Nos. 2, 10, and 13, 13 feet 2 inches long.)

Carriage No. 10.

(*List of Changes*, § 4184).

(*Plates VII. and VIII.*)

This carriage consists of two brackets, formed of wrought iron plates, connected by two transoms and a bottom plate. Angle iron is riveted round the trunnion holes to give sufficient bearing for the trunnions, and steps are riveted on each bracket for raising the breech of the gun with handspikes.

A bracket is fixed under the front of the bottom plate for the attachment of the piston rod of the buffer, and clip plates are bolted to the same plate to hold down the carriage.

The front rollers are secured in wrought iron flanges, riveted at the front of each bracket. The rear rollers are on an eccentric shaft, which is held in metal flanges bolted to the brackets, so as to form recesses for the rollers. The bracket plates are slotted to fit over the eccentric shaft, which can be removed by unbolting the flanges.

The carriage is run up by means of light iron pointed levers inserted in sockets attached at each end of the eccentric shaft on which the rear rollers run.

The bearings of the axles are metal bushed, and there are metal trunnion plates.

The elevating gear consists of an elevating screw, a stool bed, and coils. The screw works through a removable nut in a metal pan.

Carriage No. 13.

(*List of Changes*, § 4212).

This is similar to No. 10, with the exception of the width between the trunnions, which is $2\frac{1}{4}$ inches less to suit the smaller size of the 58-cwt. gun.

Platform No. 11.

(*List of Changes*, §§ 4210, 4212.)

(*Plate VII.*)

This is the 16-foot dwarf wood platform, reduced in length to 13 feet 2 inches, and fitted with a hydraulic buffer, which is supported by a wrought iron bracket at the rear, and rests on and is secured by wrought iron bands to the rear and centre transoms. The platform is strengthened inside each side by an iron plate, to which is riveted a plate for the clips of the carriage. The rear block is supported by stays of plate and angle iron, secured along the underside of each side and to the block. The trucks and racers are the same as for the 16-foot dwarf platform.

The pivot plate has four 3-inch holes, which are so placed that the platform can be used for either a C, D, E, or F pivot, by changing the direction of the trucks to suit the different racers.

The pivot block, No. 4, is of cast iron; it should be set so as to stand 1 foot 0.25 inch above the top of the racers. The pivot plug has a double handle, so that it can be removed while the buffer is in position.

Platform No. 12.

(List of Changes, §§ 4210, 4212.)

(Plate VIII.)

This is similar to the No. 11, but it has no pivot plate; the rear block is reduced in height, and the front trucks and flanges are special.

Height of	{ Carriage Nos. 10 and 13		....	....	3 feet.
	{ Platform No. 11		....	....	2 feet 1 $\frac{3}{4}$ inches.
	{ „ No. 12		....	....	1 foot 6 $\frac{1}{2}$ inches.
Elevation	....	....	....	4 feet 3 inch parapet.	15°
Depression	....	....	....	5°	8 $\frac{1}{2}$ °
Diameter of trucks	{ No. 11 platform		....	Front.	12 inches
	{ No. 12 „		....	6 $\frac{1}{2}$ „	12 „

Radii of Racers.

			Front.		Rear.
C	....	....	6 feet 1 inch	....	6 feet 1 inch.
D	....	....	9 „	....	3 „ 4.25 inches.
E	....	....	10 „ 8.25 inches	....	2 „ 2 „
F	....	....	12 „ 10 „	....	2 „ 2 „

Carriage, Garrison, Sliding, Medium No. 11.

(Iron, R.M.L. 64-pr. 71-cwt., 3 feet 6 inch parapet, for 11 feet platform, No. 13.)

Platform, Traversing, Medium No. 13.

(Wood, B.L. 7-inch 82-cwt., R.M.L. 64-pr. 71-cwt., 3 feet 6 inch parapet for iron carriages Nos. 3 and 11 (11 feet long).)

(List of Changes, §§ 4209, 4484.)

(Plate IX.)

This carriage is constructed to allow 15° elevation and 8° depression over a 3 feet 6 inch parapet.

It is similar in general form and arrangement to No. 10 carriage (Plates VII. and VIII.), but the recoil is checked by an E.O.C. compressor, instead of the hydraulic buffer.

The platform is the 16 feet wood platform reduced in length to 11 feet, and fitted with compressor bars and a tripper for the compressor gear.

The rear racer is of special radius, viz., 14 feet.

Height of {	carriage	....	....	....	3 ft. 0 in.
	platform	....	....	....	1 " 5.75 "
Total					4 " 5.75 "
					<hr/>
Diameter of trucks	{	front	....	....	6½ inches.
		rear	....	....	12 "

Carriage, Garrison, Sliding, Medium No. 12.

(Iron, R.M.L. 64-pr. 71-cwt., 2 feet 7 inch parapet, for platform No. 19.)

Platform, Traversing, Medium No. 19.

(Wood, R.M.L. 64-pr. 71-cwt., 2 feet 7 inch parapet, for iron carriage No. 12, 13 feet 2 inches long.)

(List of Changes, §§ 4484, 4485.)

(Plate X.)

This carriage is similar in general form and arrangement to No. 10 carriage, but it is 3 inches less in height, and is fitted with spur wheel elevating gear to adapt it for firing over a 2 feet 7 inch parapet with $13\frac{1}{2}^{\circ}$ elevation and $8\frac{1}{2}^{\circ}$ depression.

The elevating gear consists of a spur pinion and wheel on each side of the carriage, transmitting motion from a hand wheel to a pinion gearing into an arc. The hand wheels are connected by a cross shaft, to which the pinions are keyed, and the arcs by a cradle on which the breech of the gun rests. A small cramp with screw, acting on each spur wheel, limits the slip of the gear when firing.

The platform is similar in all respects to No. 12 (Plate VIII.), with the exception of the rear block and the front trucks, which are arranged to make the platform suitable for a 2 feet 7 inch parapet.

Height of { carriage	....	....	....	2 ft. 9 in.
platform	....	....	....	1 " 1 "
Total				3 " 10 "
Diameter of trucks				{ front 5 inches.
				{ rear 12 "

Carriage, Garrison, Sliding, Medium No. 23.

(Wood, R.M.L. 64-pr. 71-cwt., dwarf for platforms Nos. 16 and 18, also S.B. 8-inch 65-cwt. or 60-cwt., for platform No. 17.)

Carriage, Garrison, Sliding, Medium No. 24.

(Wood, R.M.L. 64-pr. 58-cwt., dwarf, for platforms Nos. 16 and 18, also S.B. 32-pr. 58-cwt. or 56 cwt., for platform No. 17.)

Platform, Traversing, Medium No. 17.

(Wood, B.L. 40-pr., and S.B. guns, dwarf, for wood carriages Nos. 20, 23, and 24, 16 feet long, also for rifled M.L., A and B pivots only.)

Platform, Traversing, Medium No. 16.

(Wood, B.L. 7-inch, R.M.L. 80-pr. 5 tons, and 64-pr. dwarf, for wood carriages Nos. 16, 17, 22, and 23, 16 feet long.)

Platform, Traversing, Medium No. 18.

(Wood, R.M.L. 80-pr. 5 tons, 64-pr. 71-cwt. and 58-cwt., 6 feet parapet for wood carriages Nos. 22, 23, and 24, 16 feet long.)

Carriage No. 23.

(List of Changes, § 4484.)

(Plates XI. and XII.)

This carriage is of oak or teak, with sabicu or African oak blocks to take a bearing on the platform. It is fitted with 8-inch metal rollers to facilitate running up, and the elevating nut oscillates in a metal pan. In other respects it is similar to the standing carriage for the 58-cwt. gun described page 5. The metal rollers are secured by wrought iron flanges, bolted to the front of each bracket, and the bearing surfaces of the front block are fitted with metal friction plates to prevent wear; a guiding piece projects beneath each block, to guide the carriage as it slides upon the platform.

Two eye-bolts for tackle are fixed on each bracket and an eye plate on the rear block for the preventor rope or for the pintail of the transporting dilly. A loop for the priming irons, and two iron supports for a coin, are fitted at the right side. Two loops are fixed in the rear block, and a pawl stop in the rear of each bracket, for the roller handspikes, employed when running up.

Carriage No. 24.

(List of Changes, § 4484.)

This is similar in general form and material to the No. 23, differing from it principally in the width, which is about 3 inches less to suit the smaller size of the 58-cwt. gun.

Platform No. 17.

(List of Changes, § 4484.)

(Plate XI.)

This is the 16 feet wood traversing platform. It is of teak, and consists of two sides with cheeks, three transoms, a head block, and a rear block. Four cast iron flanges with wrought iron trucks are fitted on the underside. The trucks are 12 inches in diameter. The sides are 16 feet by 1 foot by 1 foot, placed 21 inches apart; the ends are hooped, and the upper surfaces shod with iron plates.

Platform No. 16.

(List of Changes, § 3576.)

This platform is similar in every respect to No. 17, except that it is fitted with a pivot plate fixed under the platform to the rear block and an additional block across the platform. This plate has four 3-inch pivot holes, which are so placed that the platform can be used for a C, D, E, or F pivot, by changing the direction of the trucks to suit the respective racers.

Platform No. 18.

(List of Changes, § 4484.)

(Plate XII.)

This is similar to No. 17 platform, but it is intended for under cover loading, and to admit of fire over a 6 feet parapet with 20° elevation and 5° depression. For this purpose the platform is blocked up by deep blocks, which are strengthened by the addition of iron stays.

An iron loop is bolted at the centre of the front truck block for the attachment of a suitable tackle, by means of which and a selvagee the gun can be depressed 20° for loading: the fall is secured to a cleat fixed to the centre block.

Three double steps are provided, one on each side near the front, and one on the right rear of the rear block.

The pivot plate is 1 foot 8 inches above the top of the racer, in which position it is secured by the centre block.

The pivot block is fitted with a metal bouch to make it suitable for a 3-inch pivot plug.

The recoil on these mountings, if too violent, is checked by the "wooden compressor."

This compressor consists of two blocks of elm (held together by two iron guide bolts), supported by iron plates between the sides of the platform, and beneath the carriage. By means of an iron eccentric block fitted in the centre with a square bolt which is worked by a lever, the blocks are forced against the sides of the platform, and so check the recoil of the carriage, which must carry the blocks with it.

Height of carriage	{	No. 23	....	....	2 feet 11 inches.
" platform	"	" 24	....	....	2 " 8.5 "
" "	"	" 16	....	....	2 " 1.5 "
" "	"	" 17	....	....	2 " 1.5 "
" "	"	" 18	....	....	4 " "

Radii of Racers.

				Front.	Rear.
A	....	....	....	5 ft. 0 in.	16 ft. 6 in.
B	....	....	....	1 " 10 "	12 " 10 "

Carriage, Garrison, Sliding, Medium No. 25.

(Wood, R.M.L. 64-pr. 58-cwt., casemate and Haxo, for platform No. 14.)

Platform, Traversing, Medium No. 14.

(Wood, B.L. 7-inch and 40-pr., R.M.L. 80-pr. 5 tons, 64-pr. 58-cwt., also for all S.B. guns, casemate for wood carriages Nos. 15, 19, 21, and 25, 16 feet long.)

(*List of Changes*, § 4484.)

This carriage is similar in material, fittings, and general construction to No. 23 carriage (Plates XI. and XII.), differing principally in being 2 feet $5\frac{1}{2}$ inches only in height, to suit a Haxo or other casemate with a 2 feet 7 inch genouillere.

The platform has no rear truck block, and the front trucks which are 5 inches in diameter, run in metal flanges. In other respects it is identical with the dwarf platform No. 17.

This platform can be converted into a dwarf or blocked-up platform (Nos. 16, 17, 18), by the addition of suitable blocks and pivot plates with the necessary alteration of the trucks.

MONCRIEFF CARRIAGES AND PLATFORMS.

(*List of Changes*, §§ 3633, 5197.)

(*Plates XIII. and XIV.*)

There are two patterns of Moncrieff carriages; in the first, the gun is placed in a carriage distinct from the elevator; in the second, the elevator itself carries the gun. For the R.M.L. 64-pr. 58-cwt., carriages of the second pattern only are used.

The gun when mounted will fire over a parapet 9 feet 4 inches high.

The carriages are composed of two main parts, viz. :—

- 1st. The Platform.
- 2nd. The Elevator.

Platform.

The platform is composed of two H iron girders, these are kept together by a transom of H iron in front, and one of T iron at the rear, and the pivot socket.

It is fitted with a self-acting brake drum (s^2) and pinions (x^2) on the main shaft (c^3); the pinions work in gear with straight retaining racks (y^2, z^2) which slide along the top of the platform; and the racks are connected to the elevator by the bars (l^2, m^2) and pins.

The platform is supported by three cast iron trucks (l^1, m^1) with their flanges (c^1, d^1). The trucks have holes drilled in their periphery for the insertion of the service 4-feet iron pointed lever; and by which the platform is traversed.

Pawls (v^2, w^2) are fitted to each side of the platform, which, when in gear with teeth cut on the top of the retaining racks (y^2, z^2), prevent the gun being run up. These are intended to be used when the gun is left standing in the loading position, but not when in action.

Elevator.

The elevator has two sides; they are formed by riveting two $\frac{3}{8}$ -inch boiler plates on cast iron frames.

Bearings (a) are formed for the reception of the trunnions of the gun on the top of the sides.

On the end of each truunion of the gun, collars are fixed by means of the loops to prevent any outward tendency in the sides.

The counterweight is a cast iron block secured between the sides by horizontal bolts.

Estimated Weight.

								Tons.
Gun	....	...	....	....	....	....	....	2.9
Elevator, with counterweight....					....	....	....	7.7
Platform....		...	....	....	....	....	....	3.1
Gear	....	....	....	....	....	....	....	0.3
								<hr/> 14.0

INSTRUCTIONS FOR MOUNTING.

1. The pivot block and sweep plates having been fixed, the platform (*f*), with its trucks (*b*, *m*¹) attached, is lifted into its place, and the pivot bolt or pin, after being cleaned and greased, is then inserted.

2. The retaining racks (*y*², *z*²) are moved to the front by means of the ordinary 4 feet iron pointed levers inserted into the capstans (*n*²), until the pinions (*x*²) cease to be in gear with them; they should then be taken out, cleaned, oiled and replaced: care being taken that each comes into gear with its pinion at corresponding teeth.

3. Having carefully numbered the teeth on the guide racks and the corresponding spaces on the rolling surfaces of the elevator, the elevator with the counterweight attached to it by means of the bolts should be lifted and lowered into its place, taking care that the proper teeth are in gear, it should be held steady in about the loading position by blocks of wood across the platform under the counterweight.

4. Remove the capsquares (*b*, *c*), and, having cleaned and oiled the truunions of the gun, and the gun-metal bearings (*a*), place the latter on the truunions (attending to their marks), then lift and lower the gun into its place, supporting the breech by a temporary block of wood, placed clear of the elevating gear; replace the capsquares (*b*, *c*), and fasten them.

5. The gun-metal patch or joint having been fixed under the rear of the gun, attach the bars (*n*¹, *o*¹) to the elevator and to the elevating guide (*l*¹), then attach the connecting rod (*z*¹) to the gun, and the other end of it to the bars (*n*¹, *o*¹), after which the temporary block under the breech of the gun can be removed.

6. The collars on the ends of the truunions should be fixed securely in their places by means of the loops; one is replaced by a reflecting sight.

The method of working the brake gear and its general arrangement, should always be explained to the gunner who is told off to work it *for the first time*.

Adjusting during Erection.

1. When the carriage is counterweighted, it will be found to be adjusted for full charges.

2. The most convenient position for loading is marked, so that the gun may be run up to that position should it recoil beyond it.

3. The friction cones (*q*¹, *r*¹) are adjusted by screwing home the nut with a spanner or knock up wrench, 24 inches long, the power applied to which in screwing up should not exceed that of one man: after being thus adjusted the lock nut should be set up. If too much slip occurs in action the nut can be screwed up and locked.

After these adjustments, and when all the parts separated for convenience of transport have been fixed in their places, the temporary blocks under the counterweight can be removed, and the bearings cleaned and oiled.

5. When the gun is run up to the firing position, and laid P. B., the pointer (γ^1) should be adjusted by filing it until it indicates zero on the scale graduated on the metal plate on the outside friction cone (r^1).
The gun is then ready for action.

NOMENCLATURE OF MONCRIEFF ELEVATOR AND PLATFORM.

		No.
a.	Bearings, metal, cylindrical, trunnion, complete	2
b.	} Capsquares, cast iron	left 1
c.		right 1
d.	Elevator, body, iron, without fittings, with counterweight....	1
e.	Screws, W.I., capsquares	4
f.	} Axles for trucks, W.I., with collars and pins, plain	front 2
g.		rear 1
h.	} { friction, roller, arc	left 1
i.		right 1
k.		left 1
l.		right 1
m.		left 1
n.		right 1
o.		centre right 1
p.		pinion inside left 1
q.		spindle inside right 1
r.		elevating outside 1
s.	rear truck	2
t.	} Shafts, main	left 1
v.		right 1
w.	spindle, worm	1
y.	} Brackets, W.I., complete, with bolts { guide, elevating	left 1
z.		right 1
a. ¹	} and screws { standard	left 1
b. ¹		right 1
c. ¹	} Flanges, for trucks, C.I., front	left 1
d. ¹		right 1
e. ¹	Ladders, W.I., with bolts and stays	left 1
f. ¹	Platform, body, W.I., without fittings	1
g. ¹	} Pointers, W.I., with screws	front 1
h. ¹		rear 1
i. ¹	Stage, wood, with stays, landing	left 1
l. ¹	} Trucks, C.I., plain { front, 18" diameter	2
m. ¹		rear, 24" " 1

GEAR ELEVATING—

n. ¹	} Bars, W.I., radius, complete	left 1
o. ¹		right 1
p. ¹	Collars, C.I., bar, radius	2
q. ¹	} Cones, C.I., friction	inside 1
r. ¹		outside 1
t. ¹	Guide, W.I., elevating, with arc, central	1
v. ¹	Pinion, W.I., elevating, with spindles, collars, nuts, and pins	1
w. ¹	} Pins, W.I., with collar and pin	guide elevating 1
x. ¹		rod connecting 1
y. ¹	Pointer, W.I., indicator	1
z. ¹	Rod, W.I., connecting, central, with bolts	1
a. ²	} Rollers, friction, C.I.	arc elevating 1
b. ²		guide " 2
c. ²	Roller, friction, metal guide, elevating	1

d^2 .	} Spindles, W.I., with collar and	{ nut worm	....	....	....	1
e^2 .			pin friction	{ arc elevating		1
f^2 .	} Stage, wood, laying, with stays	{ roller	....	{ guide	,,	1
g^2.			....	....	....	1
h^2 .	} Wheels	{ metal worm	....	....	....	1
i^2.			....	....	{ W.I., hand	1

GEAR RETAINING—

k^2 .	Band, friction brake drum, with bolts, W.I.	....	....	left	1
l^2 .	} Bars, W.I., connecting, with bolts	....	....	{ left	1
m^2 .				{ right	1
n^2 .	Capstan, heads, C.I.	....	....	....	2
o^2 .	Collars, W.I., shaft, main	....	....	....	2
p^2 .	Counterweight, C.I., brake, lever, with set screws	....	....	....	1
q^2 .	} Covers, W.I., complete, rollers, rack retaining	....	....	{ left	1
r^2 .				{ right	1
s^2 .	Drum, brake, complete	....	....	left	1
t^2 .	Levers, wood, iron-pointed, light, land and naval	....	....	....	3
u^2 .	Lever, W.I., brake, band	....	....	....	1
v^2 .	} Pawls, W.I., rack retaining	....	....	{ left	1
w^2 .				{ right	1
x^2 .	Pinions, W.I., spur, rack retaining, 9 teeth	....	....	....	2
y^2 .	} Racks, W.I., retaining	....	....	{ left	1
z^2 .				{ right	1
a^3 .	Roller, rack, retaining, metal (set of 8)	....	....	....	1
c^2 .	Shaft, W.I., main, with nuts	....	....	....	1
d^2 .	Spindles, W.I., with nuts, collars and pins, bar connecting	....	....	....	2
e^2 .	Spindles, W.I., with nuts, pawl, rack retaining	....	....	....	2
f^2 .	Springs, steel, for pawl, brake drum	....	....	....	4

BRAKE DRUM—

g^2 .	Pawls, W.I., brake drum	....	....	....	....	4
h^2 .	Pins, pawl	....	....	....	....	4
i^2 .	Bolts, W.I., brake drum	....	....	....	....	8
m^2 .	Wheel, C.I., ratchet, brake drum	....	....	....	....	1

GENERAL INSTRUCTIONS FOR CARE AND PRESERVATION.

Care should be taken that all nuts, screws, and bolts are properly tightened up; on no account should a hammer be used in doing this.

A nut, screw, or bolt, if removed, should be slightly oiled before being replaced, and a few turns should be given by hand before employing the spanner, to prevent damage by the threads crossing.

All bright parts should be kept clean and slightly coated with Field's grease No. 3.

All bearings should be well lubricated through holes provided for the purpose, and the small screws should be replaced after lubrication.

All working parts should be kept clear of clotted grease, dirt, and corrosion.

When the mountings are not required for immediate use, the buffer piston rods should be disconnected and pushed home in the cylinder, and the removable parts of the various gears placed in store.

These articles should be frequently examined, to ensure their being kept clean and in good condition; they should also be fitted in their places and worked once in three months.

Elswick Compressor Gear.

The compressor plates and bars are on no account to be greased, but excessive rust should be scraped off to ensure uniform resistance.

Hydraulic Buffer.

To fill the buffer: Run the carriage up, remove the filling plug, and by means of the gallon measure run in the requisite quantity of fluid, and replace the filling plug.

As the quantity of fluid in the buffer is liable to diminish from various causes, care should be taken before firing that the contents of the cylinder are in accordance with that given on the inscription plate.

If the buffer leaks at the gland, and tightening up the latter does not remedy it, the packing must be renewed.

To renew the packing: Run the carriage up; empty the buffer; unscrew the gland with the "spanner hydraulic buffer No. 2," and extract the defective packing. Well tallow the fresh packing, insert it in the stuffing box, and replace the gland.

Moncrieff Mountings.

The retaining racks, teeth of bevelled wheels, pivot bolt, and the inside of the trunnion rings must be well lubricated.

The friction cones of the elevating gear must be kept clean, and not allowed to set. They are adjusted by tightening up the nuts on the end of the cross-shaft. If too much slip occurs in action, the nuts must be again screwed up and locked.

The brake drum must be kept free from rust and grease; the drum should be occasionally examined to see that the pawls and springs are in working order. The pawls should be lubricated by oiling the ends of the studs.

The tension of the brake band should be sufficient to retain the gun in the loading position. The tension can be regulated by altering the position of the counterweight on the lever.

NOTE.—The registered number of the mountings should always be quoted in reports, to admit of identification.

AMMUNITION.

Projectiles.

(*List of Changes, §§ 3172, 3717, 4083, 4538; Army Circulars, 1.9.84.*)
(*Plate XV.*)

	lb.	oz.
Common Shell, Mark V, filled, with 7 lb. 2 oz. bursting charge	64 11
Shrapnel shell, Mark VII, filled, with 9 oz. bursting charge	66 12
Case shot, Mark V....	40 14½

These projectiles are interchangeable for all natures of 64-pr. guns, and the case shot is interchangeable for the 80-pr. gun and the 6.3-inch howitzer.

Common shell is used on land fronts against earthworks, buildings, &c.; on sea fronts against shioning.

Shrapnel shell is used when the range is beyond the effective power of case shot; on land fronts against bodies of troops, on sea fronts against boats. Case shot is used for close quarters against troops or boats. Either one or two shot at a time may be used, as deemed necessary.

Instructions for Filling Shell.

All shells before being filled should have the fuze-holes and interior thoroughly examined to ascertain that they are dry and clean.

Common.

Remove the plug from the fuze-hole, insert the leather funnel and pour in the bursting charge; the shell should be tapped with a mallet or a piece of wood to ensure its being completely filled, just leaving room for the fuze if it is to be fuzeed with a time fuze, this can be done by inserting a piece of wood the same size as the fuze; after filling the shell carefully wipe every portion of powder from the fuze-hole, then screw in the plug.

In shells that are liable to be moved, or that are not required for immediate use, and in shells for use in the field or boats in naval service, insert the wad, papier-mâché, G.S., with the side on which the shalloon is cemented downwards, *i.e.*, next the powder; drive it in with the "Drift, wood, G.S.," as far as the shoulder on the drift will allow, and then screw in the plug.

Shrapnel.

Remove the plug from the fuze-hole, and after seeing that the fuze-hole is clear of any dirt, &c., insert the leather funnel and pour in the bursting charge, which has been previously weighed out or measured. This must be done gradually, for if the whole of the powder is put in at once the tube will probably become choked. The shell should be tapped on the side with a wooden mallet, until the whole of the bursting-charge has passed down the tube, taking care that none of the powder is left at the bottom of the socket. Drop in the metal primer and, by means of the large Shrapnel screwdriver, screw it tightly into the tube, and then screw in the plug.

Examination of Shells.

Common.

Remove the fuze-hole plug, pass the "metal hook for removing wads" through the hole in the centre of the wad, and draw the wad out of the fuze-hole; if the powder charge is in a serviceable condition, insert a new papier-mâché wad, and re-plug the shell as directed in instructions for filling. If the powder charge is found to be caked from the effects of damp, empty the shell and clean it out. If the powder is so caked that it will not run out of the shell, or if any powder remains adhering to the interior of the shell, fill the shell with boiling water and allow it to stand for about five minutes, then pour out the water and fill up again with boiling water. After standing for fifteen minutes more, the shell may be emptied, using the copper scraper for shells to facilitate the removal of the wetted powder. The scraper must not be applied until after fifteen minutes have elapsed after the second quantity of boiling water has been poured in. When the shell is perfectly dry, refill with serviceable powder.

Shrapnel.

Remove the fuze-hole plug, unscrew the primer with the "large screw-driver," and lift out the primer with the "metal pincers for removing primers"; turn the shell nose downwards, and if the powder charge flows out and is serviceable, refill and replace primer and plug; the shell should be well shaken if the powder does not come out quite freely, as a portion of the

powder may possibly be jammed in the tube; if the powder cannot be extracted as above, being caked from the effects of damp, &c., the primer and plug will be replaced, and steps taken for the exchange of the shell.

Note.

If means are available, a wooden horse placed over the open mouth of an empty powder-barrel should be used when emptying shells by up-ending them, and for shells filled with powder in bags, a piece of metal tubing, or a piece of sheet copper rolled up into a tube as large in diameter as can be inserted through the neck of the bag, will greatly facilitate the extraction of the powder.

Fuzes.

(*List of Changes*, §§ 3821, 4045, and 4684; *Army Circulars*, 1.0.84.)
(*Plate XVI.*)

Percussion, direct action,* No. 3 (Mark I).
Time, wood, 15 seconds M.L., No. 41 (Mark II).

Preparing Fuzes—Percussion.

The only preparation required with this fuze is the removal of the metal cap, which should not be done till the shell is entered into the muzzle. The cap can be removed by bringing the centre of the bayonet joints in line with the studs on the side of the head of the fuze.

Time.

This fuze is prepared for any desired time of flight by boring through the side-hole corresponding to the required time, into the composition.

When using the hook-borer place the fuze in the hook of the hook-borer in the proper position for boring the required hole; enter the bit into the side-hole, screwing up until the bit has entered as far as the borer will allow, taking care to press the fuze with the fingers so as to ensure its bedding fairly in the hook.

Unscrew, and, when the bit is quite clear, remove the fuze from the hook. The length of the bit is so regulated that, when placed in the handle, it will enter sufficiently far into the composition when screwed down to the shoulder. If the bit should become unserviceable, the handle must be detached from the shank and the tightening screw unscrewed, the square hole in the hook being made for that purpose. Care must be taken when substituting another bit that it is properly placed in the handle, and that the tightening-screw firmly presses upon it, for if any space be left between the handle and the head of the bit, the end will not enter a sufficient depth into the composition. The borer should be occasionally examined and cleaned. The operation of preparing the fuze and fixing it in the shell takes, on an average, about 15 seconds; with a little practice these operations may be performed in a shorter time.

Fixing Fuzes—Percussion.

This fuze is screwed firmly into the fuze-hole by means of the "key, iron, plug, G.S.," which fits into the square recess in the cap.

Time.

The fuze is fixed in the fuze-hole by screwing it round by hand until it is firmly held in the fuze-hole, or by giving the head of the fuze two or three smart taps with a mallet or suitable piece of wood, or by striking it against

* On land ranges (or sea ranges where shell may be left exposed by the tide), R.L. fuzes are to be used instead of direct action fuzes.

the gun carriage if more convenient; this operation should be performed carefully so as not to split or injure the top of the fuze: the fuze must not be uncapped until the shell is placed in the muzzle of the gun. These fuzes are "uncapped" by taking hold of the small end of the copper band, which is left exposed, and unwinding from left to right smartly, so as to thoroughly detach the band from the head of the fuze and to leave the priming fully exposed.

Extracting Fuzes—Percussion.

The percussion fuze is removed with the G.S. key, inserted in the recess of the cap, which, being provided with double bayonet joints fitting on to the studs of the fuze, enables the fuze to be fixed or unfixed according to the way in which it is turned.

Time.

Apply the fuze extractor to the head of the fuze and unscrew.

CHARGES.

(List of Charges, § 4871.)

Full ....	....	....	....	8½ lb. R.L.G. ⁴
Reduced ....	....	....	....	6 lb. R.L.G. ² , R.L.G., or L.G.
Saluting ....	....	....	....	5 lb. blank.

Filling Cartridges.

The cartridges will be cut so that the width of the material runs in the width of the cartridge. Silk cloth will be used for all cartridges, except where serge cartridges are in store, which will be used up first.

Braids for hooping, cut to the proper length, and with loops tied in one end, will be run into all empty cartridges excepting such cartridges as are ordered to be converted from S.B. cartridges of similar diameters. Converted cartridges made up from material obtained by cutting up old cartridges will, as a rule, be made up similarly to cartridges of new material. Cartridges which are not to be hooped with braid will be hooped with silk or worsted after being filled.

Care will be taken to see that the cartridges are properly dry before being filled, and the proper charge will be carefully weighed out, and inserted in the cartridge by means of the "Funnel, copper, cartridge."

The cartridges will be choked by drawing the mouth into several plaits with a brass needle, threaded with three strands of worsted for serge cartridges, or with two strands of silk twist for silk cloth cartridges, up to 14 lb. inclusive; after drawing together the mouth of the cartridge, three turns will be taken round the plaits, and the choke thus formed will be further secured by passing the needle three times through it alternately above and below the turns, thereby stitching down the turns round the choke at two points equidistant from each other.

The cartridges will be made up to their proper lengths and diameters by means of the hoops, which should be drawn tight so as to make a firm cartridge.

Hooping—

1st. With braid hoops.—Draw the braid through the serge or silk cloth until the knot of the loop comes home to the serge or silk cloth, the single end being already passed through the loop from underneath, pass the single end to one side of and under the loop, then draw the hoop tight and keep it so by placing the forefinger of the left hand firmly on the loop; bring the running end between itself and the loop, and draw tight the single bend thus formed, *taking care that the bend bites on the loop and not on the single end*, otherwise the knot will slip. The maintenance

of the proper form of the cartridge depends on the hooping being thus secured.

2nd. With worsted or silk twist.—After making the last stitch in chocking, the needle will be turned downwards and carried through the powder and out at the seam in the line for the front hoop, the worsted or silk twist will then be carried tightly round the cartridge so as to form a hoop, and will be stitched to the cartridge at two or three points in the same way as the turns at the choke were secured, and the remainder of the hoops will then be similarly formed.

All filled cartridges will have the initial or monogram of the station at which they are filled, stamped on the bottom end in *black printers' ink*, one inch long. About $\frac{1}{2}$ oz. of ink will be sufficient for 100 cartridges.

The cartridges filled by the Royal Artillery will be distinguished by having no initial letter stamped on them. This order does not apply to cartridges filled by working parties of Royal Artillery for the Ordnance Store Department (see § 3564, "List of Changes in War Material, &c.").

The following initials and monograms will be used at the several stations mentioned :—

Home Stations.

Alderney	A	Dublin	DN	Pembroke	P
Aldershot	A	Edinburgh	E	Sheerness	S
Chatham	C	Fort George	FG	Tynemouth	T
Chester	HC	Gosport	G	Upnor	U
Cork	HC	Guernsey	G	Woolwich	W
Devonport	D	Harwich	H		
Dover	VR	Jersey	J		

Foreign Stations.

Barbadoes	B	Hong Kong	HK
Bermuda	B	Jamaica	JA
Cape Town	C	Kingston, Canada	K
Ceylon	C	Malta	M
Gibraltar	GIB	Mauritius	M
Halifax, N.S.	H	Quebec and Montreal	Q

All cartridges will be very carefully examined and gauged as to length and diameter previous to packing.

Drill Cartridges.

These are issued complete from store. They are of wood covered with raw hide, made to the shape of the cartridges they represent, and (generally) to the same weight as the full charge.

TUBES.

(List of Changes, § 3842.)

Tubes, friction, copper, L.S. short.
(438)

RANGE TABLE FOR 64-PR. R.M.L. CONVERTED GUNS OF 58 AND 71 CWT.

Based on Practice of 10.2.85 and 13.3.85.

Minutes 7,639-7,744.

Charge, 6 lb. R.L.G.²; gravimetric density, $\frac{29.0}{0.999}$.*

Projectile, common shell, weight 65 lb.

Muzzle velocity, 1,125 f.s.

Mounting, wood garrison.

Jump, 13 minutes.

* The shell should be rammed to 6.4 inches from the bottom of the bore.

Range.	Elevation.	Angle of descent.	Slope of descent.	Remaining velocity.	Time of flight.	Fuze Scale. 15 seconds M.L. wood time fuze.	
yards.	° '	° '	1 in	f. s.	seconds.	yards.	fuze.
0				1,125		175	0.5
100	—	0 13	270	1,103	0.27	245	1.0
200	0 13	0 27	127	1,082	0.54	310	1.5
300	0 26	0 41	84	1,063	0.82	380	2.0
400	0 40	0 56	61	1,046	1.20	445	2.5
500	0 54	1 11	48	1,031	1.38	515	3.0
600	1 8	1 27	40	1,017	1.67	580	3.5
700	1 22	1 43	33	1,005	1.97	650	4.0
800	1 37	2 0	29	993	2.28	715	4.5
900	1 52	2 17	25	981	2.59	785	5.0
1,000	2 7	2 35	22	969	2.91	850	5.5
1,100	2 22	2 53	20	958	3.23	920	6.0
1,200	2 37	3 12	18	947	3.55	985	6.5
1,300	2 53	3 32	16	936	3.87	1,050	7.0
1,400	3 9	3 53	15	925	4.20	1,115	7.5
1,500	3 25	4 15	13	915	4.53	1,180	8.0
1,600	3 42	4 37	12	905	4.86	1,245	8.5
1,700	3 59	5 0	11	895	5.19	1,310	9.0
1,800	4 17	5 24	11	885	5.53	1,375	9.5
1,900	4 35	5 48	9.8	875	5.87	1,440	10.0
2,000	4 53	6 13	9.2	865	6.21	1,505	10.5
2,100	5 12	6 39	8.6	856	6.56	1,570	11.0
2,200	5 31	7 6	8.0	847	6.91	1,635	11.5
2,300	5 51	7 34	7.5	838	7.27	1,700	12.0
2,400	6 11	8 3	7.1	829	7.63	1,760	12.5
2,500	6 33	8 33	6.7	821	7.99	1,825	13.0
2,600	6 54	9 3	6.3	813	8.36	1,885	13.5
2,700	7 16	9 34	5.9	805	8.73	1,950	14.0
2,800	7 38	10 5	5.6	797	9.10	2,010	14.5
2,900	8 1	10 37	5.3	789	9.48	2,075	15.0
3,000	8 24	11 10	5.1	781	9.86	2,135	15.5
3,100	8 47	11 43	4.8	773	10.25	2,200	16.0
3,200	9 11	12 17	4.6	765	10.6	2,260	16.5
3,300	9 36	12 52	4.4	757	11.0	2,325	17.0
3,400	10 2	13 27	4.2	750	11.4	2,385	17.5
3,500	10 28	14 3	4.0	743	11.8	2,450	18.0
3,600	10 55	14 40	3.8	737	12.2	2,510	18.5
3,700	11 22	15 17	3.7	730	12.6	2,570	19.0
3,800	11 50	15 55	3.5	723	13.0	2,630	19.5
3,900	12 19	16 34	3.4	716	13.4	2,690	20.0
4,000	12 48	17 14	3.2	709	13.8	2,745	20.5
						2,805	21.0
						2,860	21.5
						2,920	22.0
						2,975	22.5
						3,030	23.0
						3,085	23.5
						3,140	24.0
						3,195	24.5
						3,250	25.0
						3,305	25.5
						3,360	26.0
						3,410	26.5
						3,460	27.0
						3,510	27.5
						3,560	28.0
						3,610	28.5
						3,660	29.0
						3,710	29.5
						3,770	30.0

RANGE TABLE.

Based on Practice of 10.2.85 and 13.3.85.

Minutes 7,639-7,744.

Charge, 8½ lb. R.L.G.†; gravimetric density, $\frac{28.0}{0.990}$ †

Projectile, common shell, weight 65 lb.

Muzzle velocity, 1,260 f.s.

Mounting, siege travelling.

Jump, 10 minutes.

† The shell should be rammed 7.9 inches from the bottom of the bore.

Range.	Elevation.	Angle of descent.	Slope of descent.	Remain- ing velocity.	Time of flight.	Fuze Scale, 15-seconds M.L. wood time fuze.	
yards.	° '	° '	1 in	f. s.	seconds.	yards.	fuze.
0				1,260		170	0.5
100	0 1	0 11	300	1,232	0.24	245	1.0
200	0 12	0 23	149	1,205	0.49	315	1.5
300	0 23	0 35	93	1,179	0.74	385	2.0
400	0 35	0 48	72	1,154	1.00	455	2.5
500	0 47	1 1	56	1,131	1.26	525	3.0
600	0 59	1 15	46	1,109	1.53	595	3.5
700	1 12	1 29	39	1,087	1.80	665	4.0
800	1 25	1 44	33	1,067	2.03	735	4.5
900	1 33	1 59	29	1,051	2.36	805	5.0
1,000	1 52	2 15	25	1,036	2.64	870	5.5
1,100	2 6	2 32	23	1,022	2.93	940	6.0
1,200	2 20	2 50	20	1,009	3.23	1,005	6.5
1,300	2 35	3 9	18	996	3.54	1,075	7.0
1,400	2 50	3 29	16	984	3.85	1,140	7.5
1,500	3 5	3 50	15	972	4.16	1,210	8.0
1,600	3 21	4 11	14	961	4.47	1,275	8.5
1,700	3 37	4 33	13	950	4.79	1,345	9.0
1,800	3 53	4 56	12	939	5.11	1,410	9.5
1,900	4 10	5 20	11	928	5.43	1,480	10.0
2,000	4 27	5 44	10	917	5.76	1,545	10.5
2,100	4 44	6 8	9.3	907	6.09	1,615	11.0
2,200	5 1	6 33	8.7	897	6.42	1,680	11.5
2,300	5 19	6 58	8.2	887	6.76	1,750	12.0
2,400	5 37	7 23	7.7	877	7.10	1,815	12.5
2,500	5 55	7 49	7.3	867	7.44	1,880	13.0
2,600	6 13	8 15	6.9	858	7.79	1,950	13.5
2,700	6 32	8 42	6.5	849	8.14	2,015	14.0
2,800	6 50	9 10	6.2	840	8.50	2,080	14.5
2,900	7 9	9 39	5.9	831	8.86	2,150	15.0
3,000	7 29	10 8	5.6	823	9.22	2,215	15.5
3,100	7 49	10 39	5.3	815	9.59	2,280	16.0
3,200	8 10	11 8	5.1	807	9.95	2,350	16.5
3,300	8 31	11 39	4.8	799	10.3	2,415	17.0
3,400	8 52	12 10	4.6	791	10.7	2,480	17.5
3,500	9 14	12 42	4.4	783	11.1	2,545	18.0
3,600	9 36	13 14	4.3	775	11.4	2,610	18.5
3,700	9 59	13 46	4.1	767	11.8	2,675	19.0
3,800	10 21	14 19	3.9	759	12.2	2,740	19.5
3,900	10 44	14 52	3.8	752	12.6	2,800	20.0
4,000	11 8	15 26	3.6	745	13.0	2,860	20.5
						2,920	21.0
						2,975	21.5
						3,035	22.0
						3,095	22.5
						3,150	23.0
						3,210	23.5
						3,265	24.0
						3,325	24.5
						3,380	25.0
						3,440	25.5
						3,495	26.0
						3,550	26.5
						3,605	27.0
						3,660	27.5
						3,715	28.0
						3,770	28.5
						3,825	29.0
						3,880	29.5
						3,930	30.0

DRILL.

FOR 64-PR. R.M.L. GUNS, ON COMMON STANDING
CARRIAGES.

The detachment consists of nine numbers and falls in two deep.

To Tell Off.

Officer.Tell off.No. 1.

At "Tell off," No. 1 (who is on the left of the detachment) takes a pace to his front, turns to his right, and numbers himself 1, the right-hand man of the rear rank numbers 2, the right-hand man front rank 3, the second man from the right of the rear rank 4, the man in his front 5, and so on; after the detachment is told off No. 1 falls in again on the left of the front rank.

The detachment is marched into the battery and halted in line facing the parapet, and to the left rear of the platform. The detachment is now in position of "detachment rear."

To Take Post under Cover.

Officer.Take post under cover.No. 1.Right turn.
Double march.

The detachment stepping off, wheels to its left at the left corner of the platform; the front rank filing to the left of the gun, the rear rank to the right, 2 and 3 halting close to the parapet and near the embrasure; 4 and 5 forming upon their right and left, and the whole turning to the right-about together. No. 1 follows in rear of the detachment, and at drill forms up on the right of No. 5; 6 and 8 go to the cartridge store (6 outside), and 7 and 9 to the shell store (7 outside).

General Duties.

No. 1 commands, directs, or superintends boring and fixing fuzes, directs the gun into the line of fire in running up, and lays.

No. 2 searches, sponges, rams home, runs up, elevates and traverses.

No. 3 loads, uncaps or removes safety pin from fuze when in the bore, rams home, runs up, elevates, and traverses.

No. 4 attends to side arms and supplies them to 2, runs up and attends to the elevating screw and coin in laying.

No. 5 attends to vent, runs up, makes ready and fires.

No. 6 supplies 3 with cartridges.

No. 7 attends to fuzes and brings up projectiles.

No. 8 attends to cartridge store and serves out cartridges to 6.

No. 9 attends to shell store, issues shells, tubes, and fuzes.

To Prepare for Action.

Officer.Prepare for action.No. 1.Prepare for action.
Examine gun.

"Prepare for action."

The stores are brought up as follows:—

No. 1, handspike and sights.*

No. 2, handspike and assists 4 with side-arms.†

* 6-foot handspikes are used with this gun.

† See para. 3718, List of Changes.

No. 3, handspike and elevating screw, removes the tampon from the muzzle.

No. 4, handspike, side-arms, and support for heads of side-arms.

No. 5, handspike, tubes in box, lanyard, prickler, and vent-server.

No. 6, two cartridge cases, which he leaves at the cartridge store, bucket filled and brush (two drill cartridges for drill purposes).

No. 7 fuzes, fuze and shell implements. He obtains the fuze boxes from 9, having ascertained from No. 1 the nature of fuzes required; he satisfies himself as to the correctness of fuzes and fuze implements.

No. 8 prepares to issue cartridges.

No. 9 provides a brush for cleaning shell, prepares to issue shells, friction tubes, and fuzes, after which he examines the shells carefully, cleaning them if necessary, and removing burrs from studs; he loosens the fuze-hole plugs of shells that will be first issued.

The stores having been brought up, No. 1 will satisfy himself that the foresights fit properly on the gun, that the deflection leaves of the hind sights work easily, and that the platform is properly swept; he receives reports from the Nos. responsible of any irregularity or deficiency in connection with the gun, ammunition, or stores.

The sponge and rammer are laid on the ground clear of the platform, to the right of the gun and parallel to it, heads to the rear, resting on the support supplied by 4, sponge nearest the gun; the shell extractor and wad hook so as not to interfere with the working of any of the guns in the battery, and convenient for the guns for which intended. The sponge bucket near the sponge head.

The handspikes are laid down, two on each side of the platform close to the carriage, points to the front, bevelled side uppermost; those of 2 and 3 outside and about 2 feet in advance of those of 4 and 5. No. 1's handspike in rear of the platform.

No. 3 examines the bore to see the grooves are free from grit, &c.

No. 4 sees that the elevating screw is properly oiled.

No. 5 straps the tube box round his waist on the right side, coils up the lanyard, and passes the bight of it under the tube box strap, places the prickler in the loop on the side of the carriage, examines the vent-server and places it in the vent, the loop of the vent-server lanyard over one of the sights, he fills his box with friction tubes, which he procures from 9.

If the gun is to be prepared for drill only, 8 and 9 provide and hook a tackle to the rear axletree and to a holdfast in rear of the gun.

The gun is supposed to be at the rear of the platform.

"Examine gun."

No. 5 drifts the vent, replaces the prickler in the loop and the vent-server.

No. 2 supplies himself with the wad hook, searches the gun after the prickler is withdrawn, and replaces the wad hook.

Nos. 4 and 5 take a purchase with handspikes over the cheeks and under the breech, the coin is withdrawn and the elevating screw put in by 3, No. 1 holding up the stool bed with a handspike applied over the bottom step of the carriage. No. 1 gives the order *"Lower,"* 4 and 5 withdraw their handspikes, and lay them down.

To Load.

<i>Officer.</i>		<i>No. 1.</i>
Range—yards		With—load.
With—load.		

"Load."—No. 1 gives 7 the nature of shell and fuze required, and during the loading fixes his tangent scale at the required elevation and places himself where he can best superintend the service of the gun.

No. 2 places himself in a convenient position for sponging. He places his left foot in line with and about 12 inches from the muzzle, steps to his right with his right foot and looks to his left rear, takes the sponge in a horizontal position from 4, left hand back down, right hand back up, brings it in line with the axis of the gun, enters the head into the bore, being careful to observe that the vent-server is in the vent, slides his hands along the stave to

his right as far as he can reach, sends the sponge up the bore, slides his hands out again and forces the sponge hard home, gives it two half turns, pressing it against the bottom of the bore, withdraws the sponge hand over hand, turning it from him, cleaning the bore well. When the sponge arrives near the muzzle, he jerks it out, his hands then should be in the position they were in when he introduced the sponge into the bore. He then hands the sponge to 4 and receives the rammer, right hand about the centre back down, left as near the head as possible back up; as soon as the cartridge and shell are put in, he enters the head into the bore and forces them home hand over hand. He then springs the rammer, steps out, hands it to 4 and goes under cover.

No. 3, as soon as the sponge is withdrawn, takes the cartridge from the cartridge case with his left hand,* moves up and places it in the bore, he then slews his body to his right and receives a shell from 7 and puts it in the bore, withdraws the safety pin, or uncaps the fuze, places himself in a corresponding position to 2 and assists him to ram home; when the cartridge and projectile are home he quits the stave and goes under cover. Should it appear by the mark on the rammer that the charge is not home, 2 and 3 ram home again.

No. 4 doubles out, halts in line with the sponge head, turns to his left, picks up the stave with his right hand back under, six inches from the head, turns three-quarters left about and in doing so lifts the sponge over his head, allowing the end of the stave to rest on the ground. His left hand meets the stave close to the sponge, his right hand is slipped up the stave about two feet. He then moves towards the muzzle and passes the stave into the embrasure in such a manner that 2 can conveniently lay hold of it, waiting at the left rear of 2, facing the gun to receive the sponge. When he receives the sponge from 2, he allows the end of the stave to fall on the platform, steps to his left, turns three-quarters right about, passing the sponge over his head, lays it down, takes up the rammer as before detailed for the sponge, and hands it to 2. He then remains in position to receive the rammer, which he does as soon as 2 has sprung it. He lays it down as he did the sponge and goes under cover.

No. 6 brings up a cartridge in a case and places it on the ground on 3's right front: after the sponge is withdrawn he uncovers it, and as soon as 3 has withdrawn the cartridge, he goes back to the cartridge store.

No. 7 brings up a shell, point to his right, having fixed the fuze according to No. 1's directions, and hands it to 3.

No. 8 issues a cartridge to 6.

No. 9 issues a shell to 7.

To Run Up.

Officer.

No. 1.

Run up.
Halt.

Directly the gun is loaded, No. 1 gives "*Run up*" and applies his handspike under the rear axletree to guide the gun.

Nos. 2, 3, 4, 5 take up their handspikes at the centre with the hands, next the parapet back up, the other hands at the small ends back down, stepping up to their respective axletree arms, they apply their handspikes under and in rear of them, and stand ready to heave, taking the time from 2, and using short quick purchases they heave together until the front trucks nearly touch the hurter, when No. 1 gives "*Halt*," slides his handspike to the rear, clear of the recoil, and looks over the sights, steadying himself by leaning on the cascable.

Nos. 2, 3, 4, and 5 withdraw their handspikes, drop the points to the ground; 4 and 5 lay theirs down; 2 and 3 turn to the rear and step outwards, holding their handspikes diagonally across the body, outward hands at the small ends as high as the ear, inward hands resting on the handspike at the full extent of the arm, bevelled side of the handspikes uppermost; 4, kneeling on his left knee in rear of the right cheek, takes hold of the large

* In loading, the cartridge cylinder should be kept closed until the sponge is out of the bore.

coin with both hands, or the small coin with his left hand, or works the screw as may be directed by No. 1; the screw should be used only for final adjustment; 5 goes under cover and prepares a tube.

To Lay the Gun.

Officer.

No. 1.

Elevate.
Lower.
Coin.
With screw, Elevate. Halt.
Depress, Halt.
Trail (right). Halt.
Trail (left). Halt.

No. 1, looking over his sights, gives "*Elevate*," then "*Lower*," and when the gun is at the required elevation "*Coin*." If a slight amount of elevation or depression is required, he gives "*With Screw*," "*Elevate*," or "*Depress*."

"*Elevate*," 2 and 3 step forward in line with the breech, place their handspikes, bevels down, over the steps and under the breech, and bear down; at "*Lower*," they allow the small ends to rise gently; at "*Coin*" they withdraw their handspikes and step outwards; 4 withdraws the coin as soon as 2 and 3 elevate, and at "*Coin*" forces it sharply home. If the order is "*With Screw*," "*Elevate*," or "*Depress*," 4 works the screw until "*Halt*" is given. The other numbers stand fast.

If the muzzle is to go to the left No. 1 gives "*Trail right*," and when the muzzle is sufficiently to the left, "*Halt*." At "*Trail right*" 2 moves round on his right foot to the rear of the axletree arm and applies his handspike under it to row; 3, stepping to his left, takes a purchase under the rear of the cheek and stands ready to heave over the trail. They heave together until the order "*Halt*," and remain there steady till the next order is given.

"*Trail left*" is the converse of the above. If much traversing is required the order is "*Extreme right*" or "*Extreme left*." In this case 4 and 5, according to the side, take a purchase in front of the rear truck in addition to the other numbers.

Should no order to fire be given when the gun is laid, No. 1 will give the word "*Under cover*."

To Make Ready and Fire.

Officer.

No. 1.

Fire—rounds.

No.—Ready.
No.—Fire.

No. 1 lowers his tangent scale, except when firing at a moving object, and gives "*Ready*;" 5 presses the tube into the vent with his right thumb, steps clear of the recoil, shifts the lanyard to his right hand and extends it, facing the gun.

As soon as "*Ready*" is given, 2 and 3 lay down their handspikes and with 4 go under cover.

At "*Fire*," 5 draws the lanyard strongly towards his body, without a jerk; he then drifts the vent, replaces the vent server and pricker, and goes under cover, replacing the lanyard under his belt.

No. 1 does not again give "*Load*" until 5 has replaced the vent-server.

To Run Back and Unload.

Officer.

No. 1.

Run back.
Halt.
Unload.

When the vent has been drifted and the vent-server placed in the vent, at "*Run back*" the detachment double out and man the fall of the tackle arranged

by 8 and 9 for the purpose, and heave the gun back into the position for loading, No. 1 giving "*Halt*," "*Unload*," when the gun is sufficiently run back. On this order the gun is unloaded, 2 and 3 withdrawing the charge, 4 supplying the necessary side arms.

To Cease Firing and Replace Stores.

<u>Officer.</u>	<u>No. 1.</u>
<i>Cease firing.</i>	<i>Elevate.</i>
<i>Replace stores.</i>	<i>Lower.</i>
	<i>Coin.</i>
	<i>Replace stores.</i>

"*Cease firing*," "*Replace stores*." No. 1 gives "*Elevate*," and the gun is laid under metal by 4 and 5; he then gives "*Replace stores*," and the stores are replaced by the numbers who brought them up.

To Form Detachment Rear.

<u>Officer.</u>	<u>No. 1.</u>
<i>Detachment rear.</i>	<i>Outwards turn.</i>
	<i>Double march.</i>
	<i>Halt.</i>
	<i>Front.</i>

"*Detachment rear*." No. 1 doubles to the left rear of the platform, turns to the left, and gives the order "*Outwards turn*;" 2 and 4 turn to their left, 3 and 5 to their right.

"*Double march*." 4 and 5 followed by 2 and 3 wheel to the right and left, and when clear of the platform to the right, and round No. 1's left shoulder, 6, 7, 8, and 9 coming up into their places; when 2 and 3 have passed him No. 1 gives "*Halt*," "*Front*," and changes his flank by the rear.

To Change Rounds.

<u>Officer.</u>	<u>No. 1.</u>
<i>Change Rounds.</i>	<i>Change Rounds.</i>

In changing rounds No. 2 becomes 4; 4, 1; 1, 9; 9, 8; 8, 7; 7, 6; 6, 5; 5, 3, 3, 2.

DRILL.

FOR 64-PR. R.M.L. GUNS ON REAR CHOCK CARRIAGES.

Guns mounted on rear chock carriages require the same detachment and stores as those on common standing carriages, with the exception of one roller handspike provided by No. 1 and two 7-foot handspikes by 2 and 3, instead of five common handspikes.

The drill is also the same, with the following exceptions:—

In running up, No. 1, holding his roller handspike vertically, takes a purchase under the socket in rear of the chock, bears down and raises it off the platform, keeping a firm hold of the handspike to prevent its flying up, which gives him a perfect control over the carriage and enables him to guide it. When the platform is in good order the gun runs up very fast. No. 1 in that case allows the small end of his handspike to "come up" just before the trucks reach the hurter. As soon as the gun is run up, No. 1 releases his roller handspike, takes it by the centre with his right hand and slides it well to the rear clear of the recoil.

In running up, 2 and 3 apply their handspikes at the axletree arms assisted by 4 and 5. As soon as the gun is up the handspike men turn to the rear in line with the vent.

"*Elevate*." 2 and 3 apply their handspikes, 5 double-manning 3's, 4 attending to the coins.

"*Trail Left.*" 2 applies his handspike under the right cheek behind the chock.

"*Trail Right.*" 3 applies his handspike in a similar manner under the left cheek.

"*Extreme Right,*" or "*Extreme Left.*" The numbers all go to one side and heave over, applying their handspikes behind the cheek.

The running back is performed by means of tackle, No. 1 applying his roller handspike as in running up, and the rest of the Nos. running away with the fall.

DRILL.

FOR 64-PR. R.M.L. GUNS ON TRAVERSING PLATFORMS.

The drill is the same as for 64-prs. on common standing carriages, except in the details hereafter specified.

The detachment consists of nine numbers. The additional stores required are two sets of tackle, one preventer rope, two truck levers, two iron-shod levers; two handspikes only are required.

General Duties.

No. 1 commands, directs, or superintends boring and fixing fuzes, holds on to the preventer rope, and lays.

No. 2 searches, sponges, rams home, runs up, elevates, and traverses.

No. 3 loads, uncaps or removes safety pin from fuze when in the bore, rams home, runs up, elevates, and traverses.

No. 4 attends to side arms, and supplies them to 2, runs up, attends to the elevating screw and coin in laying.

No. 5 attends to vent, supplies wedge wads, runs up, holds on to preventer rope, makes ready, and fires.

No. 6 supplies 3 with cartridges.

No. 7 attends to fuzes and brings up projectile.

No. 8 attends to cartridge store and serves out cartridges to 6.

No. 9 attends to shell store and issues shells, tubes, and fuzes.

To Prepare for Action.

"*To Prepare for Action.*"—No. 1 provides and fixes sights and preventer rope, which he attaches to the carriage, assisted by 3 (if necessary), takes two turns with it round the bollard, the running end coming off to the left at the top.

No. 2, handspike, truck lever, iron-shod lever, and assists 4 with side-arms.

No. 3, handspike, truck lever, iron-shod lever, and elevating screw. Removes muzzle tampeon.

No. 4 side-arms and support.

No. 5, wedge wads, tubes in box, lanyard, pricker, and vent-server.

No. 6, two cartridge cases (which he takes to the cartridge store), bucket filled and brush; two drill cartridges for drill purposes.

No. 7, fuzes, fuze and shell implements, one set of tackle.

No. 8 prepares to issue cartridges.

No. 9, one set of tackle and a brush for cleaning projectiles. Prepares to issue shell, tubes, and fuzes.

The handspikes and iron-shod levers are laid down bevelled, sides uppermost; the handspikes next the gun, the truck levers between them, the whole with their points to the front.

The standing blocks are hooked by 7 and 9 to the rear eyebolts of the platform, the tackles overhauled, and the ends of the falls coiled down.

"Examine Gun."—No. 5 drifts the vent, replacing the pricker and vent-server, 4 and 5 take a purchase with their handspikes over the cheeks and under the breech, and bear down. The quoin is withdrawn and the elevating screw put in by 3, No. 1 holding up the stool bed with an iron shod lever applied over the bottom step of the carriage.

No. 1 gives "Lower," when 4 and 5 withdraw their handspikes and lay them down; 2 supplies himself with the wadhook and searches the gun, after the pricker is withdrawn, and replaces the wadhook.

To Load.

No. 2 mounts on the side piece and places himself in position for sponging.

No. 3 mounts on the step to put in the cartridge, and on the platform to put in the projectile, and a wedge wad after they have been rammed home; 2 and 3 pressing it steadily home, jamming it under the head of the projectile by two smart taps.

To Run Up.

"Run Up."—No. 1 takes in the slack and holds on the preventer rope; 2, 3, 4, and 5 take up the truck levers; 2 and 3 raising the small ends to enable 4 and 5 to hook the points to the eyebolts. When this is done, 2 and 3 haul down the small ends by means of the ropes; 4 and 5 place the pawls; 4 goes under cover; 5 holds on to the preventer rope behind 1; 2 and 3 guide the levers whilst the carriage is in motion. Nos. 1 and 5 ease off, hand over hand, and hold on when the mark on the preventer rope comes over the bollard.

When the gun is in its proper position No. 1 gives "*Halt*," when 2 and 3 heave down the small ends of the levers; 4 and 5 throw back the pawls; 2 and 3 allow the small ends of the levers to rise gently, manning the ropes when the levers are above their reach.

When the rear of the carriage rests upon the platform, the levers are unhooked, withdrawn, and laid down outside the handspikes by 2, 3, 4, and 5, 4 tightening the compressor, if the carriage is fitted with one; 2 and 3 pick up their handspikes, and stand ready to elevate; 4 attending to the coils and elevating screw; 5 unhooks and takes in the slack of preventer rope.

To Lay the Gun.

The gun is elevated in the same manner as when mounted on a standing carriage; on No. 1 giving the word "*Coin*," 2 and 3 lay down their handspikes, and take up the iron-shod levers to traverse; 5 prepares a tube.

As these platforms are pivoted in front, in rear, or in the centre, the position taken up by 2 and 3 differs according to the manner in which the platform is pivoted.

Nature of Pivot.

Position of Nos. 2 and 3.

Pivot "A" (under the muzzle of the gun when run up).

"Trail right."
2 stands facing to the rear with the point of his lever resting on the rear racer; at "*Halt*" he scotches the rear truck his own side with the lever.

3 stands facing to the rear and applies the point of his lever under the left rear truck of the platform, both hands back up, and heaves the platform over to the right, taking short quick purchases.

"Trail left."

The numbers work in the opposite directions.

Pivot "B" (under the front part of the platform).

As with "A" pivot.

Pivot "C" (in the centre of the platform).	{	<i>"Trail right."</i>
		3 works as with pivot "A"; 2 takes up his position at the front truck on his own side, and works over the front of the platform to the left. At <i>"Halt"</i> 2 withdraws his lever and with it scotches the rear truck.
Pivot "D" (at an intermediate point between the centre of the platform and the rear truck).	{	<i>"Trail left."</i>
		3 works the front truck, and 2 the rear; 3 scotches the rear truck at <i>"Halt."</i>
Pivot "E" (in front of the rear block).	{	<i>"Trail right or left."</i>
		2 and 3 work the front truck, 2 heaving the front of the platform over to the left in the first case, 3 the front to the right in the second.
Pivot "F" (in the rear of the rear block).		As with "D" pivot.
		As with "D" pivot.

With platforms pivoted at "A" or "B" at *"Extreme right"* (or *"Left"*), 2, 3, 4, and 5 push over the rear of the platform in the direction ordered.

When traversing tackle is used, at *"Hook traversing tackles"* 4 and 5 hook the double blocks to the rings or holdfasts prepared for them; 2, 4, and 3, 5, haul on the tackle, or ease off at *"Trail right"* (or *"Left"*), so as to move the platform in the direction required.

If the tackle when hooked hinders the service of the gun, the double blocks are removed by 4 and 5, or the single ones by 2 and 3, as may be directed by No. 1.

To Make Ready* and Fire.

At *"Ready,"* 2 and 3 withdraw their levers, and replace them, bevels up, as scotches under the trucks, 2, 3, and 4 then go under cover. No. 5 presses the tube into the vent, descends from the platform, and stands ready to fire facing the gun; immediately after firing he drifts the vent, replacing the vent-server and pricker, coiling up the lanyard and placing it under his belt and hooks the preventer rope (except at drill).

Run Back.

"Run back."—Nos. 4 and 5, assisted by 2 and 3, hook the front blocks to the front eyebolts of the carriage and take in the slack. The truck levers are applied as in running up; No. 1, standing between the checks, holds the small ends of the truck levers and guides them. All the numbers, except No. 1, man the falls on their respective sides, and at *"Heave"* haul the gun back.

When the gun is run far enough back, No. 1 hauls down the levers by the ropes till the pawls fall; the levers are then allowed to come up, No. 1 rising with them; 2, 3, 4, and 5 unhook the truck levers and lay them down; 5 hooks the preventer rope.

The front blocks are unhooked by 4 and 5 who carry them to the rear, overhaul them, assisted by 2 and 3, lay them down clear of the racers, and coil down the ends of the falls.

DRILL.

FOR MONCRIEFF CARRIAGE.

The detachment consists of 9 Nos. and falls in two deep.

* When the firing No. cannot reach the vent without mounting up on the platform, No. 1 will place the tube in the vent.

To Tell Off.

As with 64-pr. on common standing carriage.

To take Post under Cover.

As with 64-pr. on common standing carriage.

General Duties.

No. 1 commands, directs, or superintends boring and fixing fuzes, attends to the brake in running up, and lays.

No. 2 searches, sponges, places projectile in bore, rams home (attends to iron-pointed lever if required), and elevates.

No. 3 loads, uncaps or removes safety-pin from fuze when in the bore, rams home (attends to iron-pointed lever if required).

No. 4 attends to side-arms, supplies them to 2 (attends to iron-pointed lever if required).

No. 5 attends to vent, supplies wedge wads, traverses (attends to iron-pointed lever if required), makes ready and fires.

No. 6 supplies 3 with cartridges.

No. 7 attends to fuzes and brings up the projectile.

No. 8 attends to cartridge store, serves out cartridges to 6.

No. 9 attends to shell store, issues shell, tubes, and fuzes.

To Prepare for Action.

To prepare for action No. 1 provides and fixes sights.

No. 2 assists 4 with side-arms, iron-pointed lever, and elevating wheel.

No. 3, iron-pointed lever, removes the muzzle tampeon.

No. 4, side-arms and support (a sponge with wire rope stave, and rammer) with jointed stave.

No. 5, traversing handle, wedge wads, tubes in box, lanyard, pricker and vent-server.

No. 6, two cartridge cases (which he takes to the cartridge store), bucket filled and brush, two drill cartridges for drill purposes.

No. 7, fuzes, fuze and shell implements, set of gun tackle.

No. 8 prepares to issue cartridges.

No. 9, brush for cleaning projectile, set of gun tackle, prepares to issue shell, tubes, and fuzes.

The sponge and rammer are laid down on the right of the gun, close to the parapet, head towards the muzzle, an iron-pointed lever on each side of the gun, the shell extractor and wadhook outside the pit.

At "*Examine Gun*," No. 5 drifts the vent replacing the pricker and vent-server, No. 4 supplies 2 with the wadhook and replaces it.

No. 2 searches the gun after the pricker is withdrawn, and attends to the elevating wheel, and depresses, until the muzzle is in a convenient position for loading.

To Load.

No. 1 at "*Load*" gets the gun into a convenient position, *i.e.*, the upper edge of the counterweight nearly horizontal.

No. 2 depresses the gun if necessary, and places himself in a position for sponging, puts in projectile.

No. 3 puts in the cartridge, and a wedge wad after the charge has been rammed home, 2 and 3 pressing it steadily home, jamming it under the head of the projectile by two smart taps.

After the loading is completed, 2 gives 1° more of elevation as shown on the arc.

To run Up.

Before running up, No. 1 will give the caution "*Stand Clear,*" then holding the brake he allows the gun to run up.

He must be very careful not to let it escape from his control, and on the other hand he must not check it too soon. Should the latter be the case, No. 1 gives "*Work Levers,*" 2 and 3 work their iron-pointed levers, 2 and 4 man the right, 3 and 5 the left lever; No. 1 will give "*Down,*" "*Fresh Purchase,*" "*Halt,*" as required.

When the gun is up, No. 1 will mount up the ladder to lay it; 2 and 3 unshipping the levers when used.

No. 5 mans the traversing handle.

To Lay the Gun.

5 traverses.

2 elevate or depresses.

The gun may be laid with exposing any number, No. 1 using the reflecting sight or elevating in accordance with the graduations on the elevating drum, and traversing according to the graduated arcs on the floor.

To Make Ready and Fire.

When No. 1 has laid the gun, at "*Ready*" he drops the tube into the vent, throwing the lanyard clear of the carriage and comes down. As soon as 5 has fired he drifts the vent, replacing the vent-server and pricker, and coiling down the lanyard.

To Unload and Run Back.

(For drill purposes extra men will be required.)

To run back, 2 and 3 work their levers if required, double manned by 4 and 5, No. 1 giving "*Down,*" "*Fresh Purchase,*" "*Halt,*" as required.

Tackles to be hooked by 4 and 5, assisted by 6 and 7, and manned by all available numbers.

Unloading should be effected from the firing position before the gun is run back.

To Cease Firing and Replace Stores.

"*Cease Firing,*" "*Replace Stores.*" No. 1 gives "*Depress,*" and the gun is aid under metal by 2, he then gives "*Replace Stores,*" and the stores are replaced by the numbers who brought them up.

To Form Detachment Rear.

As with 64-pr. on common standing carriage.

To Change Rounds.

As with 64-pr. on common standing carriage.

LONDON:
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
BY HARRISON AND SONS,
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(Wt. 4698 1800 6 | 87—H & S 438)

ORDNANCE CAST IRON CONVERTED R.M.L. 64 PR. 58 CWT.

SIGHTING.

Scale 3 in = One Foot

Section through Socket Metal.

Sight Centre.

Sight Muzzle

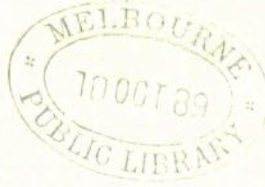
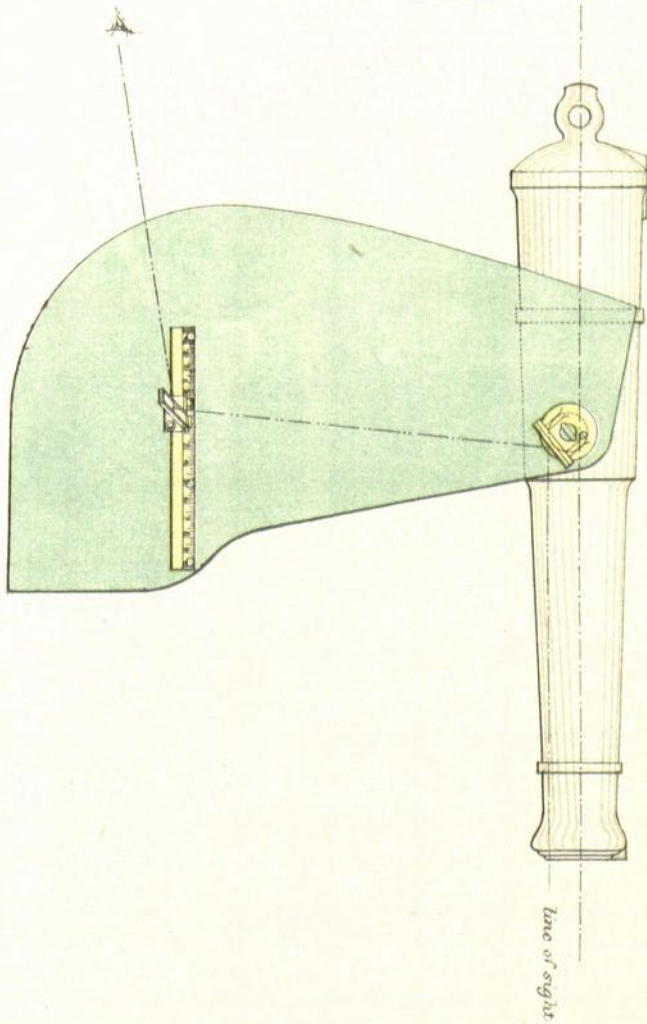
Scale; $\frac{1}{2}$ in = One Foot

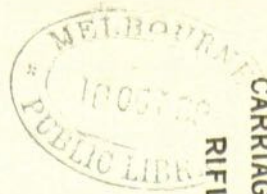
Muzzle face of sight tangent Scale.

Rear face of sight tangent Scale

CARRIAGE MONCRIEFF. $\frac{64}{32}$ PR. 58 CWT. CONVERTED GUN, MARK II.

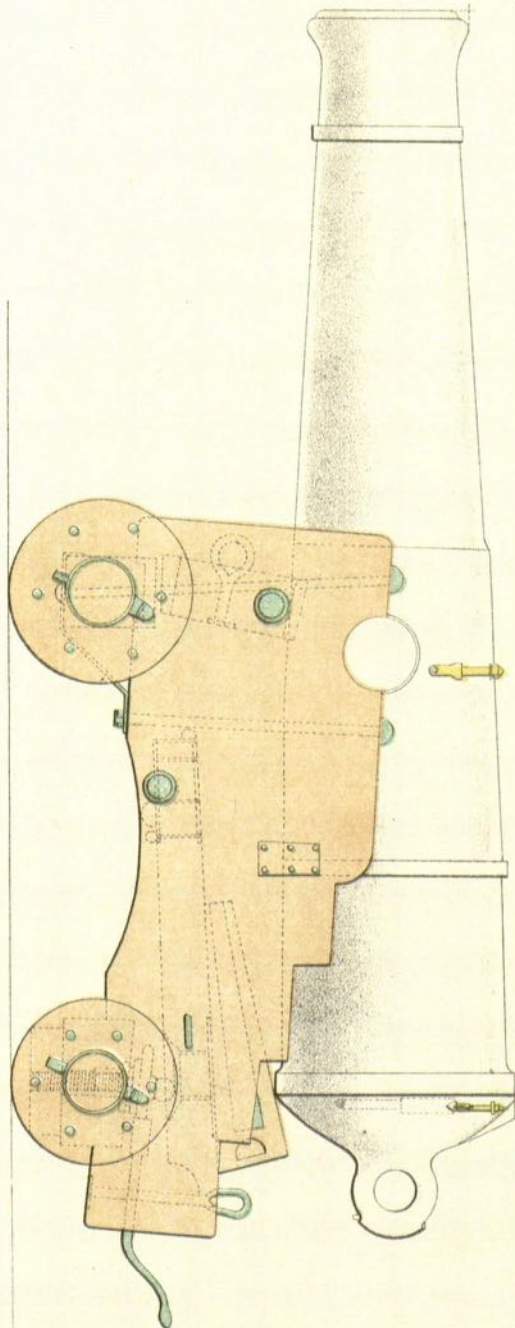
REFLECTING SIGHTS.





CARRIAGE, WOOD, GARRISON, COMMON STANDING WITH BED, COINS, AND ELEVATING SCREW,
RIFLED, M.L. 64 P. 71 CWT. (CONVERTED FROM CARRIAGE, NAVAL, COMMON 8 IN. 65 CWT. MARK I.)

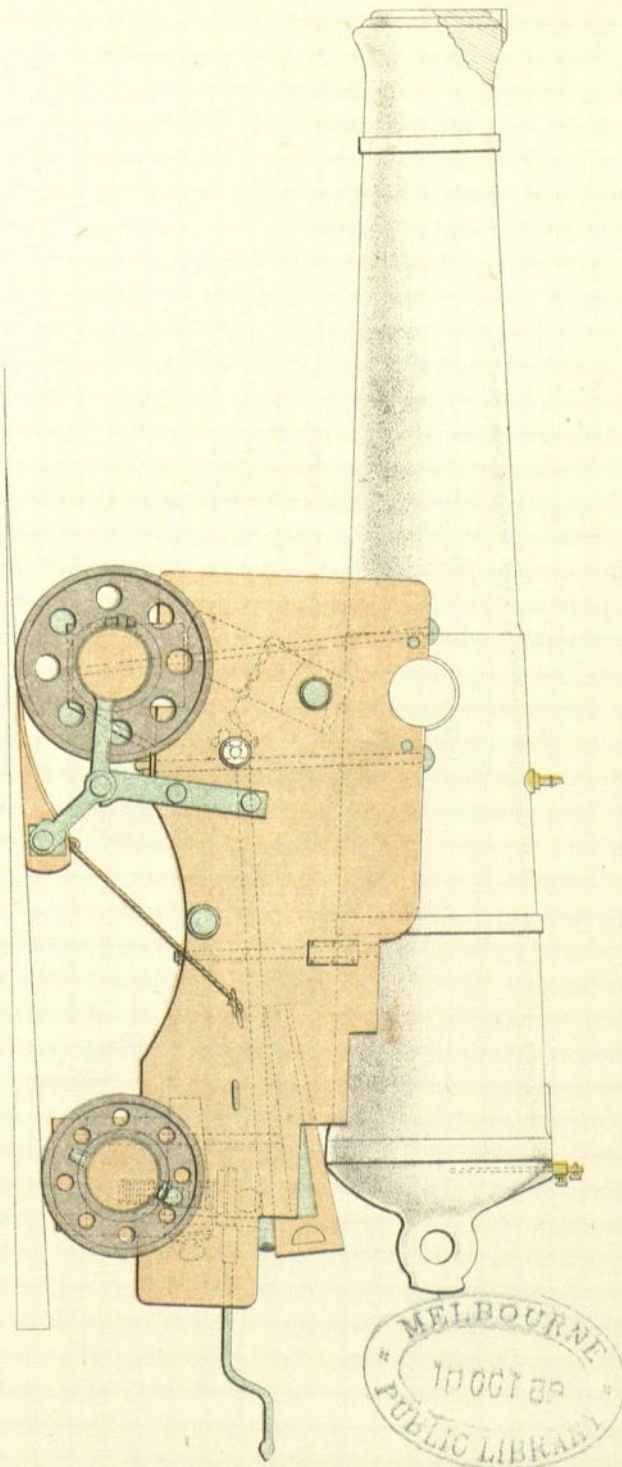
Scale, $\frac{5}{8}$ in to a foot.



R.C.D.
1734

CARRIAGE, WOOD, GARRISON, COMMON STANDING, WITH BED COINS, ELEVATING
SCREW TRUCKS, AND BREAK, RIFLED, M.L. 64 PR. 58 CWT. (MARK I.)

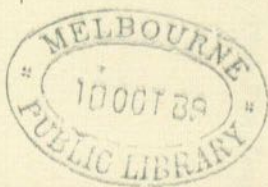
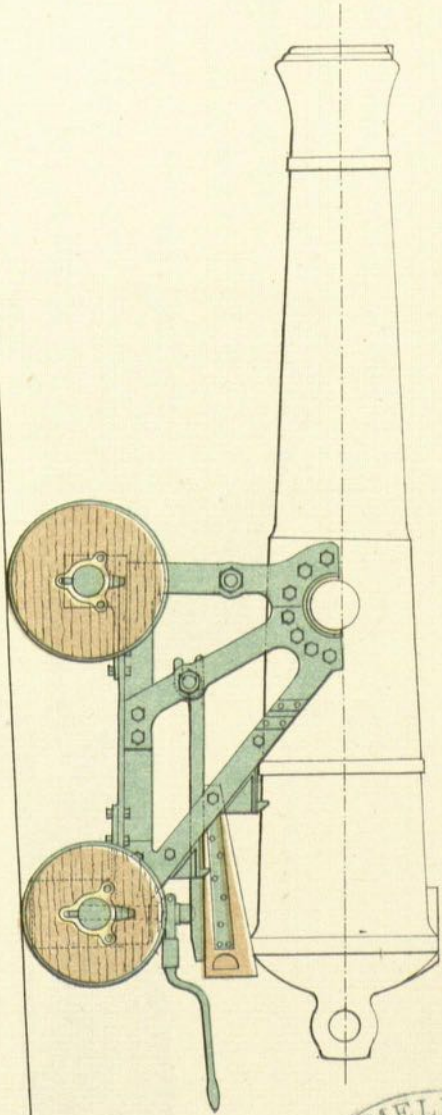
Scale, $\frac{3}{8}$ in. to a foot



R.C.D.
1745

CARRIAGE, GARRISON, COMMON, IRON, N^o 2. R. M. L. 64 P. 58 CWT.
with trunnion plates, also S.B. 32 P. 58 Cwt. .

—Scale $\frac{1}{2}$ " = 1 Foot.



R.C.D.
3203

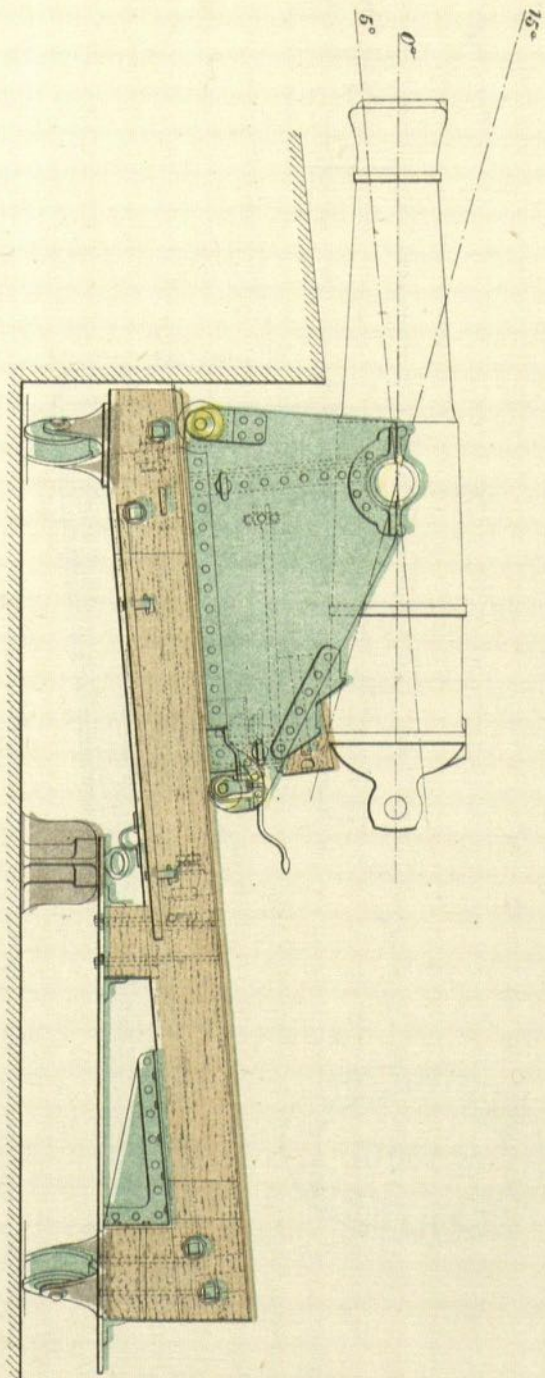
CARRIAGE, GARRISON, SLIDING, MEDIUM N^o 10.

Iron R.M.L. 64 P. 71 Cwt. 4 ft. 3 in. or 3 ft. 6 in. parapet, for platforms, Nos 11 & 12.

PLATFORM, TRAVERSING, MEDIUM N^o 11.

Wood. B.L. 7 inch 8² cwt. B.M.L. 64 P. 71 Cwt. and 58 Cwt. 4 ft. 3 in. parapet, for iron carriages Nos 2, 10, & 12, (13 ft. 2 in. long.)

Scale, $\frac{3}{8}$ in. = 1 Foot.

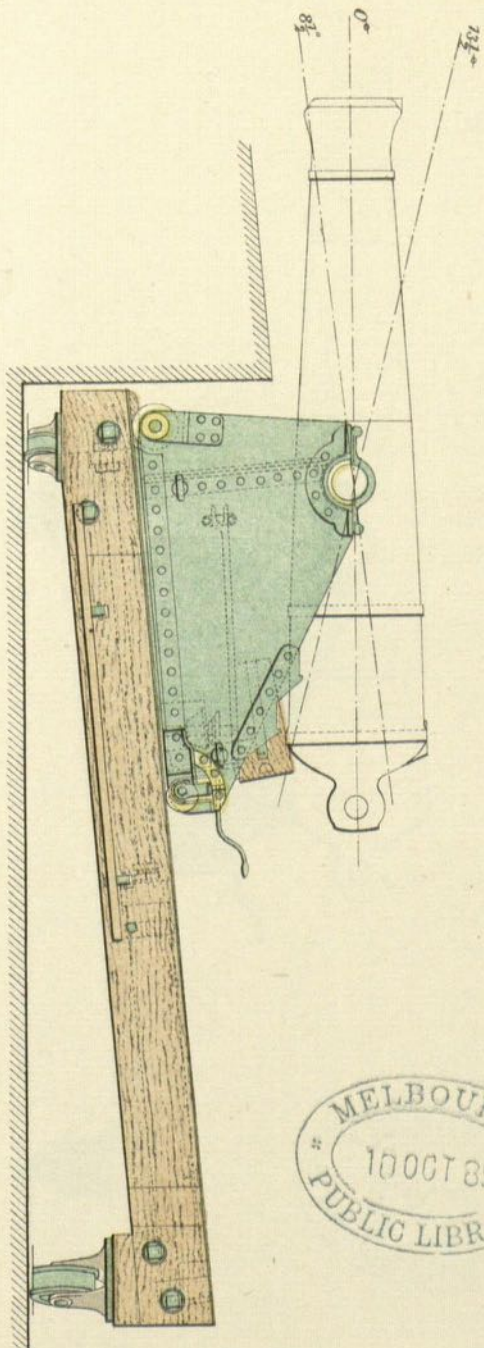


CARRIAGE, GARRISON SLIDING, MEDIUM NO. 10.
 Iron, R. M.L. 64 P., 71 Cwt, 4 ft. 3 in. or 3 ft. 6 in. parapet, for platforms Nos 11 and 12.

PLATFORM TRAVERSING, MEDIUM NO. 12.

Wood B. L. 7 inch, 82 Cwt, R. M.L. 64 P., 71 Cwt, and 38 Cwt 3 ft 6 in. parapet for iron carriages Nos 2, 10, and 13 (3 ft. 2 in long.)

Scale, $\frac{3}{8}$ " = 1 Foot



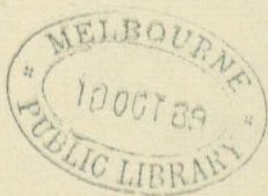
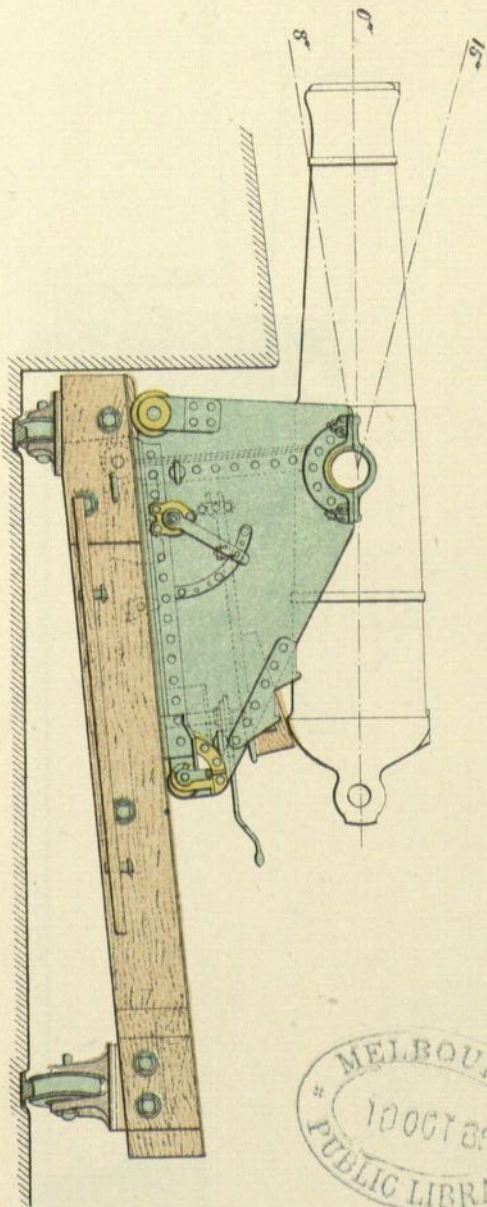
CARRIAGE, CARRISON, SLIDING, MEDIUM N.º 11.

Iron, R.M.L. 64 P. 71 Cwt, 3 Ft 6 in parapet, for 11 Ft. platform, N.º 13.

PLATFORM, TRAVERSING, MEDIUM N.º 13.

Wood B.L. 7 in 82 Cwt, R.M.L. 64 P. 71 Cwt, 3 Ft 6 in, parapet, for iron carriages, Nos 3, & 11. (11 Ft. long.)

Scale, $\frac{1}{8}$ " = 1 Foot.

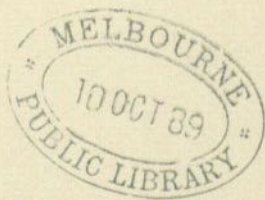
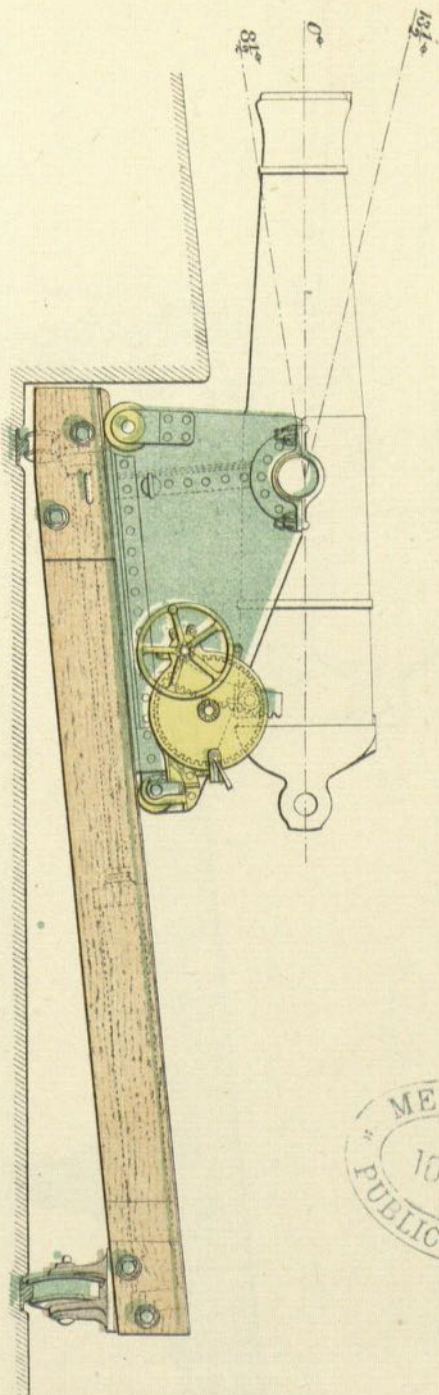


CARRIAGE, GARRISON, SLIDING, MEDIUM, N^o 12.
 Iron R. M. L. 64 P^r 71 Cwt 2 H. 7 in. parapet for platform, N^o 19.

PLATFORM, TRAVERSING, MEDIUM, N^o 19.

Wood R. M. L. 64 P^r 71 Cwt 2 H. 7 in. parapet for iron carriage, N^o 12. (15 ft. 2 in. long.)

Scale $\frac{3}{8}$ " = 1 Foot.



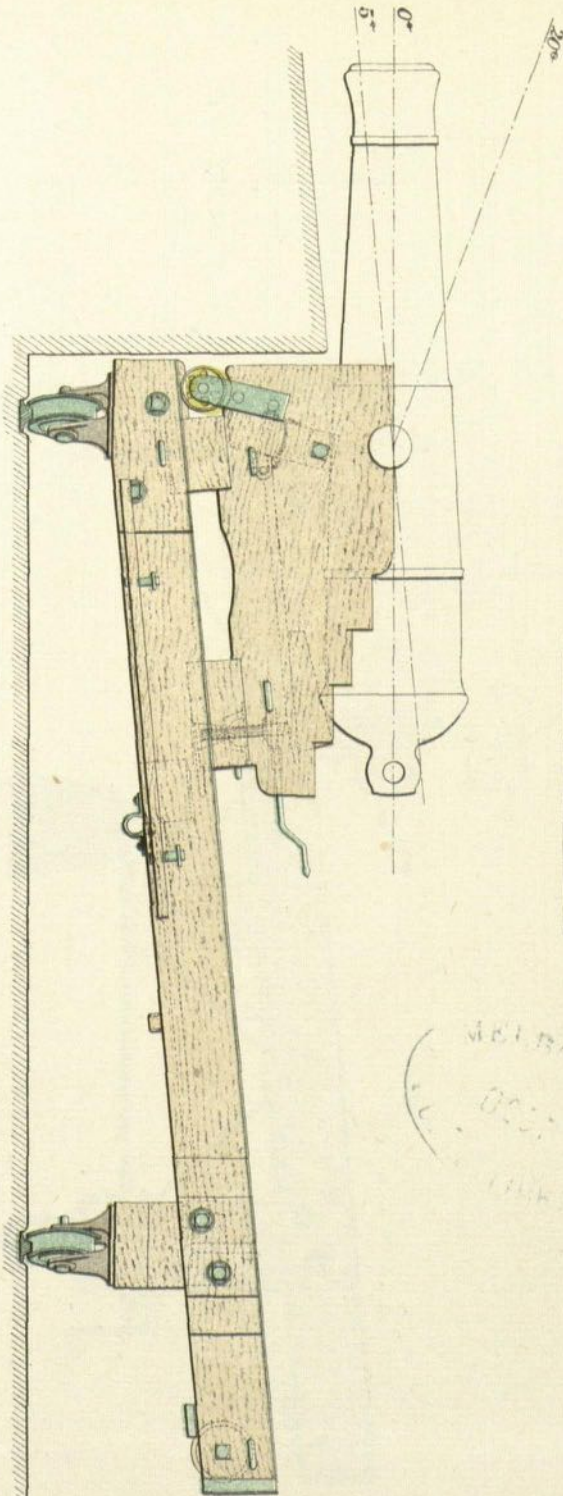
CARRIAGE, GARRISON, SLIDING, MEDIUM NO 23.

Wood B.M.L. 64 P. 71 Cwt. dwarf, for platforms, No 16 & 18, also S.B. 8 inch. 65, or 60 Cwt. for platform, No 17.

PLATFORM TRAVERSING, MEDIUM, NO 17.

Wood B.L. 40 P. also for all S.B. guns, dwarf, for wood carriages, Nos 20, 23, & 24. (16 feet long.)

Scale $\frac{3}{8}$ " = 1 Foot.

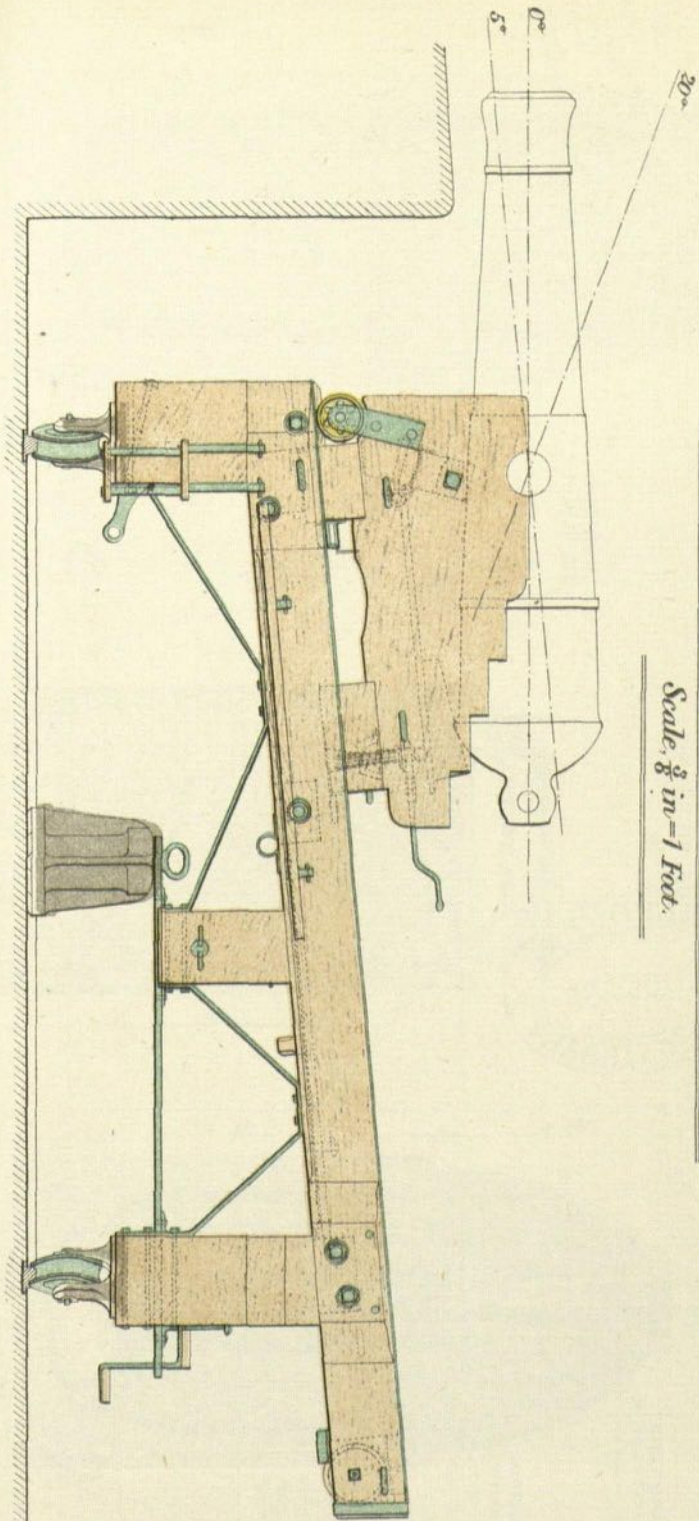


CARRIAGE, GARRISON, SLIDING, MEDIUM, NO. 23.
Wood R.M.L. 64 P.T. 71 Cwt. dwarf, for platforms Nos. 16 & 18, also S.B. 8 inch, 65, or 60 cwt, for platform No. 17.

PLATFORM TRAVERSING MEDIUM, NO. 18.

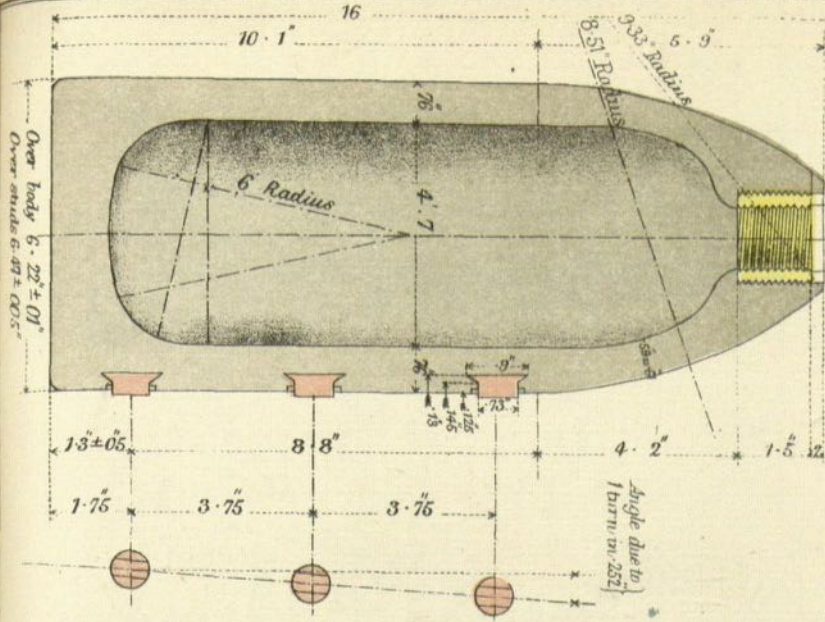
Wood R.M.L. 80 P.T. 5 tons, 64 P.T. 71 & 58 Cwt. 6 ft. pumpet, for wood carriages Nos. 22, 23, & 24 (6 feet long.)

Scale, $\frac{3}{8}$ in. = 1 Foot.



SHELL RIFLED MUZZLE LOADING, COMMON.

64 PR. V.

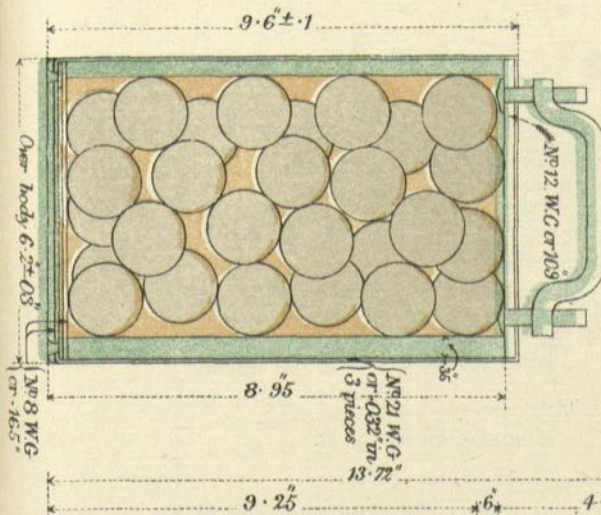


PROJECTILES.

SHOT RIFLED MUZZLE LOADING CASE

64 PR. OR 80 PR.

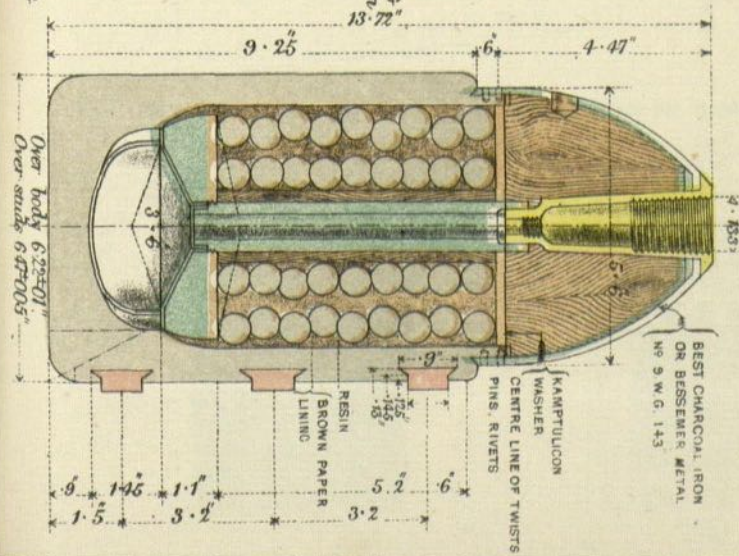
IV

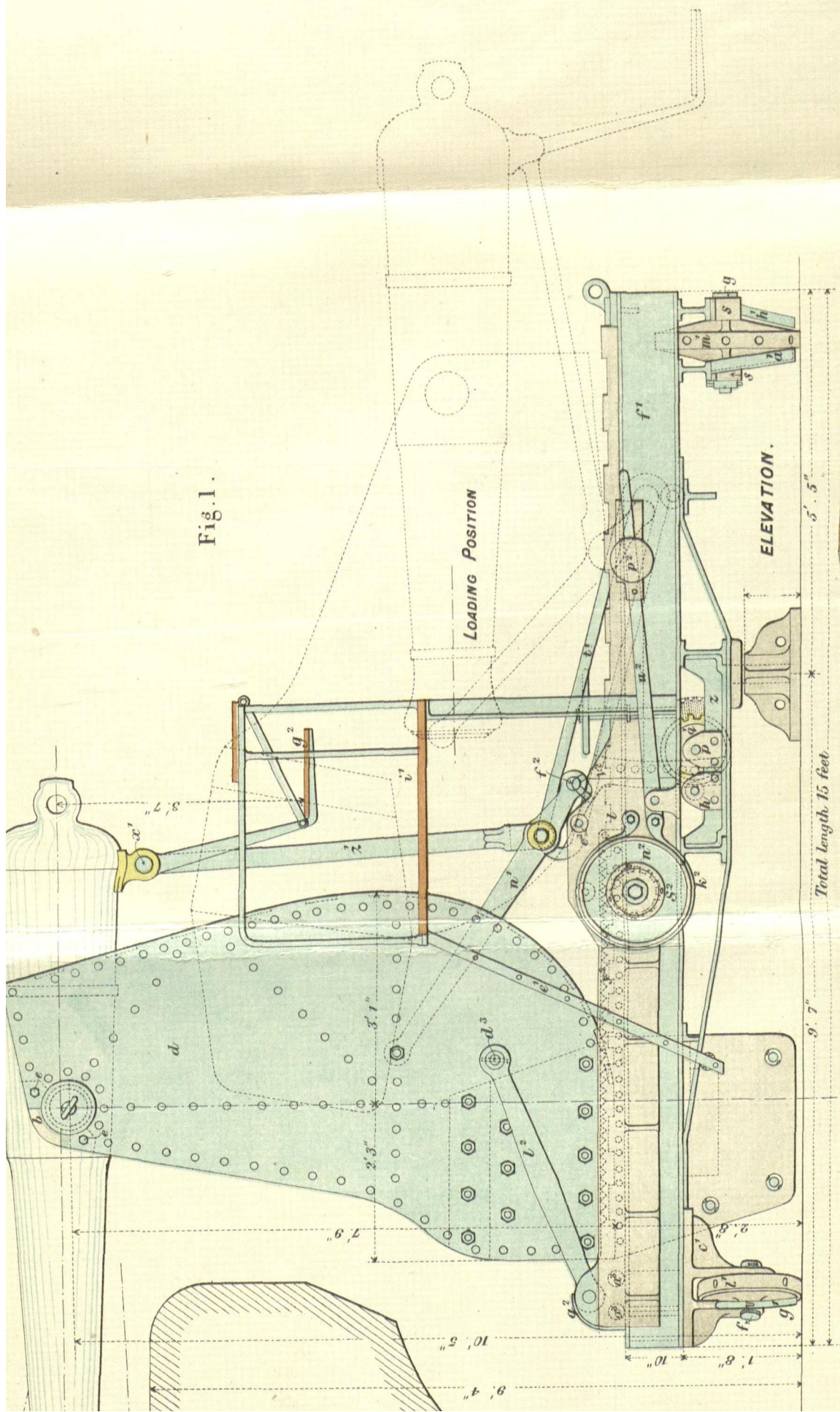


SHELL RIFLED MUZZLE LOADING BOXER SHRAPNEL.

64 PR.

VII.





WROUGHT IRON
CAST IRON
GUN METAL
WOOD

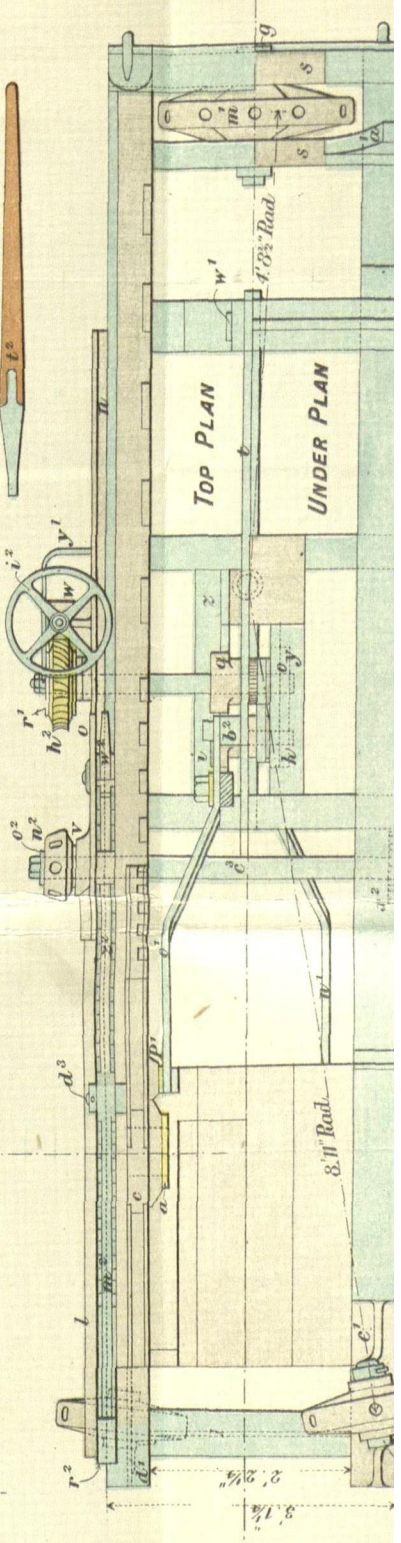
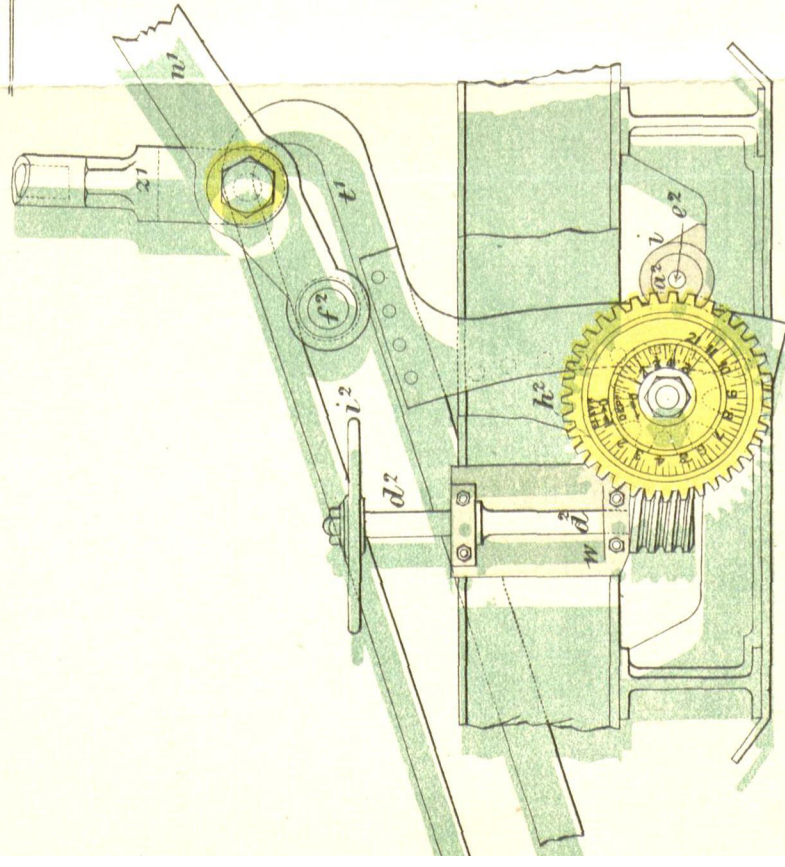


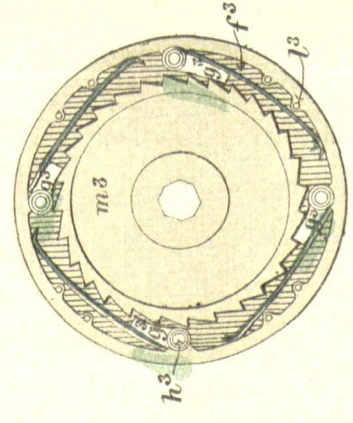
Fig. II.

ELEVATING AND PART OF RETAINING GEAR.

Scale 1 Inch to a Foot.



SIDE ELEVATION.



BRAKE WHEEL. (Front plate removed.)

INCHES 12 9 6 3 0

SCALE

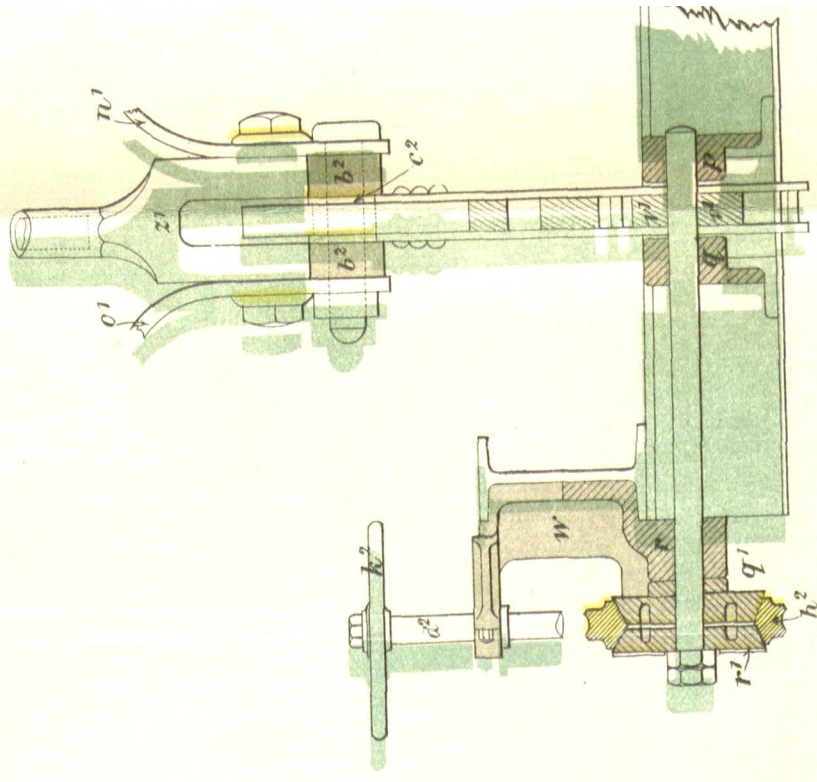
1

2

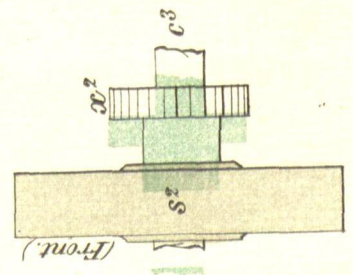
3

4

5 FEET



REAR ELEVATION
and Section through Elevating Shaft.



WROUGHT IRON.
CAST IRON.
GUN METAL.
STEEL.

